TECHNICAL REPORT

Past and Future

Insights for Reserve Component Use

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Preface

The 2001 Quadrennial Defense Review (QDR)[1] directed a "comprehensive review of Active and Reserve mix, organization, priority missions, and associated resources," requesting that the review "build on recent assessments of Reserve Component issues that highlighted emerging roles for the Reserve Components in the defense of the United States, in smaller-scale contingencies, and in major combat operations."

On November 27, 2001, Deputy Secretary of Defense Paul Wolfowitz charged the Under Secretary of Defense for Personnel and Readiness with chairing such a review, requesting that the review identify a range of innovative options concerning the active and reserve force mix and that it address how the mission of the Department of Defense (DoD) has changed under the new Defense Strategy outlined in the QDR, and how the events of September 11, 2001, have changed the focus of the Department.

Three major issue areas were to be examined:

1. What role should the Reserve Components play in Homeland Defense?
2. How can the Guard and Reserve support the Department's transformation efforts?
3. What innovative approaches can be used for Guard and Reserve structure and what additional capabilities are required to support the full spectrum of mission requirements from major regional conflicts, smaller-scale contingencies, to peacetime operations?

To conduct this review, the Office of the Secretary of Defense (OSD) requested the advice and assistance of its federally funded research and development centers (FFRDCs) as it explored these questions. RAND's three FFRDCs, Project AIR FORCE (PAF), the Arroyo Center (the Army's FFRDC), and the National Defense Research Institute (NDRI) have all conducted numerous studies germane to the review's focus. As a result, RAND's team provided support for the OSD working groups, conducting the comprehensive review by drawing upon existing research, models and data, and other expertise in homeland security; traditional warfighting missions across a full spectrum of operations; active and reserve force organization and management; defense transformation; and other topics.

This report documents the background information, research, and analysis RAND was asked to provide in support of a comprehensive DoD review of the roles and missions of the Reserve Components. It thus serves as a partial compendium of the information and analysis RAND provided for OSD's working groups—in particular, to the Deputy Assistant

[1] Donald H. Rumsfeld, *Quadrennial Defense Review Report,* Washington, D.C., September 30, 2001, p. 23.

Secretary of Defense (DASD) for Manpower and Personnel and the other DASDs of the Office of the Assistant Secretary of Defense for Reserve Affairs.

This research was conducted for the Office of the Assistant Secretary of Defense (Reserve Affairs) within the Forces and Resources Policy Center of the RAND National Defense Research Institute, a federally funded research and development center sponsored by the Office of the Secretary of Defense, the Joint Staff, the unified commands, and the defense agencies.

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The Quadrennial Defense Review, released in September 2001,[1] expresses concern about the current readiness of its operational units. Post–Cold War downsizing and widespread budget cuts have occurred side by side with intensive deployment and operational-tempo demands—conditions that have translated into a growing reliance on the Reserve Components (RC). The reserves now play a far more substantial role in military contingencies, including peacekeeping and humanitarian missions, and the military's reliance on the reserves is only expected to grow.

The QDR's new vision thus raises many questions about the most appropriate balance of capabilities between active and reserve forces and about the possible need for changes in how the Reserve Components are used. All told, the QDR notes that, as the military's transformation takes shape, DoD will continue to rely on reserve forces to help in new restructuring and reorganization opportunities. In particular, the QDR (2001, p. 23) mandated a "comprehensive review of Active and Reserve mix, organization, priority missions, and associated resources."

To take on these questions, the Office of the Assistant Secretary of Defense for Reserve Affairs formed a review team that included a number of groups and individuals inside and outside the Department of Defense (DoD), such as experts from the military services and researchers from federally funded research and development centers (FFRDCs). To help conduct the review, the team asked RAND's FFRDCs—Project AIR FORCE (PAF), the Arroyo Center (the Army's FFRDC), and the National Defense Research Institute (NDRI)—to provide support in two areas: reviewing existing research and formulating new ideas for topics identified by the review team.

Initially, RAND researchers supplied this information in three forms: as briefings of past research, as excerpts of relevant portions of past research, and as several "white papers" that either expand on past research or advance new insights for RC use. These white papers form the centerpiece of this document. Although not designed to be comprehensive or complete, these papers are think pieces commissioned in particular areas by the sponsor. They focus on the potential role of RC support in the following areas:

- *Strategic ballistic missile defense programs,* or ways the RC or new active/reserve force mixes may help in the operation of the new Ballistic Missile Defense System.
- *Homeland security operations,* including possible roles for the Reserve Component in the CONUS (continental United States) Air Defense mission and Civil Support mis-

[1] Donald H. Rumsfeld, *Quadrennial Defense Review Report,* Washington, D.C., September 30, 2001.

sions, how apportionment and mission assignment might best proceed, and how best to ensure homeland security while preserving other RC capabilities.

- *Manning and absorption problems*—specifically, ways to use the RC or blended Active Component (AC)/RC units to enhance *absorption rates* (ability to absorb inexperienced pilots into operational flying positions while meeting pilot experience goals) in units in need, such as AC fighter pilots.
- *Smaller-scale contingency operations,* or the possible use of RC personnel in deployments smaller than major theater wars (e.g., peacekeeping operations) in order to alleviate the burden on AC units and perhaps make better use of the range of skills available in the reserves.

Although these papers cover diverse topics, they are all linked by a common purpose: to provide OSD with an expansive range of considerations and alternatives for the prospective use of the reserve forces in the military of the future. As such, these papers raise key issues, point to and explore past studies and analyses, and offer recommendations for further research.

Acknowledgments

We are grateful for the assistance, facilitation, and interactions provided by our sponsor, Dr. John Winkler, during the course of this research. The report also benefited from the assistance of many colleagues at the RAND Corporation, including Robin Cole and Sonia Nagda. An earlier draft was improved significantly through the contributions of our reviewers, David Oaks and Roger Brown.

Acronyms

ABL	Airborne Laser
AC	Active Component
ACC	Air Combat Command
AD	active duty
ADSC	active-duty service commitment
AEF	Aerospace Expeditionary Force
AEW	Aerospace Expeditionary Wing
AFB	Air Force Base
AFRC	Air Force Reserve Command
AFSC	Air Force Specialty Codes
AGR	Active Guard and Reserve
API	Aircrew Position Indicator
ARG	Amphibious Ready Group
ARNG	Army National Guard
ASD	average sortie duration
AWACS	Airborne Warning and Control System
BMD	ballistic missile defense
BMDS	Ballistic Missile Defense System
BTR	bonus-take rate
CAF	Combat Air Forces
CBO	Congressional Budget Office
CBRN	chemical, biological, radiological, or nuclear
CBRNE	chemical, biological, radiological, nuclear, and high-yield explosives
COG	continuity of government
CONOPS	concept of operations
CONUS	continental United States
CRAF	Civil Reserve Air Fleet
CS	Civil Support

CST	Civil Support Team
CVBG	naval carrier battle group
DASD	Deputy Assistant Secretary of Defense
DCSOPS	Deputy Chief of Staff for Operations
DD(X)	destroyer
DoD	Department of Defense (U.S.)
EAF	Expeditionary Aerospace Force
EMT	Emergency Medical Team; emergency medical technician
EP	Emergency Preparedness
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FPCON	Force Protection Condition
FTF	Future Total Force
FWE	fighter wing equivalent
FY	fiscal year
GMD	Ground-Based Midcourse Defense
HLD	homeland defense
HLS	homeland security
IDA	Institute for Defense Analysis
IDO	initial defensive operations
IO	Information operations
IP	instructor pilot
ISR	intelligence, surveillance, and reconnaissance
JCS	Joint Chiefs of Staff
JSTARS	Joint Surveillance and Target Attack Radar System
LFA	Lead Federal Agency
LIMEX	limited experience
MAGTF	Marine Air-Ground Task Force
MEU	Marine Expeditionary Unit
MFO	Multinational Force and Observers
MP	Military Police
MTW	Major Theater War
NGB-MD	National Guard Bureau Missile Defense Office
NORAD	North American Air Defense Command
NORTHCOM	Northern Command
NSSE	National Security Special Events

OASD(RA)	Office of the Assistant Secretary of Defense for Reserve Affairs
OCONUS	outside the continental United States
OOTW	Operations Other Than War
OSD	Office of the Secretary of Defense
PAA	primary aircraft authorization
PSRC	Presidential Selected Reserve Call-up
QDR	Quadrennial Defense Review
RC	Reserve Component
RCE-05	Reserve Component Employment 2005
RDT&E	Research, Development, Test, and Evaluation
SMDC	Space and Missile Defense Command
SSC	smaller-scale contingency
TASS	Total Army School System
TFAP	Total Force Absorption Policy
TPFDD	Time-Phased Force and Deployment Data
TTE	time-to-experience
UPT	Undergraduate Pilot Training
USAR	U.S. Army Reserve
UTE	aircraft utilization
WMD	weapons of mass destruction

CHAPTER ONE

Introduction

In a December 2002 Pentagon Town Hall Meeting with several of the Under Secretaries of Defense, the Undersecretary of Defense for Personnel and Readiness, David Chu, was asked to address the Department of Defense's (DoD's) vision for the future use and integration of the reserve forces. Under Secretary Chu replied,

> We see the reserve forces as an indispensable part of the total military posture of this department. As you know, in the Cold War, the department had one vision of what they were, which was largely a mirror image of the active force. And I think, while we're still debating this proposition, we're increasingly seeing them as a complement. . . . It doesn't mean there wouldn't be stand-alone and reserve units, but that there would be much closer integration over time between . . . so-called active and reserve forces.

Dr. Chu's comments reflect widespread changes in the way military planners perceive the role of the reserve forces. These changes accelerated as the U.S. military embarked on its force transformation, a transformation that has become more focused and substantially more complicated since the events of September 2001.

In fact, less than three weeks after the September 11, 2001 ("9/11") attack on the United States, the U.S. Department of Defense released its much-anticipated Quadrennial Defense Review (QDR),[1] a top-down look at the nation's defense strategy. As set forth in Secretary of Defense Donald Rumsfeld's introduction, the QDR placed particular emphasis on shifting the nation's military from a "threat-based" model to a "capabilities-focused" one. In other words, the future military will focus less on identifying *who* might pose a threat, and more on *how* the United States might be endangered. Ultimately, the goal is to create a more flexible force prepared for the demands posed by new and diverse adversaries.

The Quadrennial Defense Review released in September 2001 expresses concern about the current readiness of its operational units. Post–Cold War downsizing and widespread budget cuts have occurred side by side with intensive deployment and operational-tempo demands—conditions that have translated into a growing reliance on the Reserve Components (RCs): the Army National Guard, the Army Reserve, the Naval Reserve, the Marine Corps Reserve, the Air National Guard, the Air Force Reserve, and the Coast Guard Reserve. Indeed, reserve support multiplied from 1.4 million duty days in fiscal year (FY) 1989 to almost 13 million in FY2001.[2]

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[1] Donald H. Rumsfeld, *Quadrennial Defense Review Report,* Washington, D.C., September 30, 2001.

[2] Office of the Assistant Secretary of Defense for Reserve Affairs, *Review of Reserve Component Contributions to National Defense,* Washington, D.C., December 20, 2002, p. vii.

In a departure from their past role as a supplemental force used almost exclusively for low-probability/high-intensity conflicts, the reserves now play a far more substantial role in military contingencies, including peacekeeping and humanitarian missions. Further, because the Active Component (AC) has been reduced in recent years at a higher rate than have the reserves, the RC has become a readily available means by which to reduce stress in the active forces as they seek to keep up with heightened operational tempos. In addition, the reserve forces offer valuable capabilities, such as civil engineering expertise, weather flights, and air traffic control, that are in comparatively short supply in the AC.[3]

This reliance on the reserves is only expected to grow now that homeland security has become a critical priority; for instance, as DoD places increasing emphasis on counterterrorism training for federal, state, and local first responders, they will need to call upon the capabilities of the reserves and the National Guard.

The QDR's new vision thus raises many questions about the most appropriate balance of capabilities between active and reserve forces and about the possible need for changes in how the Reserve Components are used. All told, the QDR notes that, as the military's transformation takes shape, DoD will continue to rely on reserve forces to help in new restructuring and reorganization opportunities. In particular, the QDR mandated a "comprehensive review of Active and Reserve mix, organization, priority missions, and associated resources." On November 27, 2001, two months after the QDR was released, Deputy Secretary of Defense Paul Wolfowitz directed the Under Secretary of Defense for Personnel and Readiness to chair such a review. The intent was to build on recent assessments suggesting promising roles for the Reserve Components in the nation's defense, from small-scale contingencies to major combat operations. Further, the review would identify a range of new options concerning the active and reserve force mix. It would also address how the mission of DoD has changed under the new defense strategy as outlined in the QDR, and how the events of September 11, 2001, have changed the focus of the Department.

The review was designed to tackle three major questions:

- What role should the RCs play in homeland defense?
- How can the Guard and Reserve support the Department's transformation efforts?
- What innovative approaches can be used for Guard and Reserve structure and what additional capabilities are required to support the full spectrum of mission requirements from major regional conflicts, smaller-scale contingencies, and peacetime operations?

To take on these questions, the Office of the Assistant Secretary of Defense for Reserve Affairs formed a review team that included a number of groups and individuals inside and outside DoD, such as experts from the military services and researchers from federally funded research and development centers (FFRDCs). To help conduct the review, the team asked RAND's FFRDCs—Project AIR FORCE (PAF), the Arroyo Center (the

[3] Under Secretary Chu commented during the aforementioned December 2002 Town Hall Meeting,

> I think we see the Reserves as a terrific way to reach talent in the civil sector that we really cannot grow, should not try to grow, necessarily, in large numbers in the active force. I'll offer information technology as an example of that, but also certain types of medical skills; trauma surgery, for example, is another kind of thing that exists in the civil sector that's hard for us.

Army's FFRDC), and the National Defense Research Institute (NDRI)—to provide support in two areas: reviewing existing research and formulating new ideas for topics identified by the review team.

Specifically, RAND's role was to assist the Office of the Secretary of Defense (OSD) working groups conducting the review by drawing upon existing research, models and data, and other expertise in homeland security; traditional warfighting missions across a full spectrum of operations; active and reserve force organization and management; defense transformation; and other topics. Forms of support included the following:

- Identifying potential RC roles in homeland defense and traditional missions by drawing from and expanding upon RAND's research on active/reserve force-mix alternatives.
- Conducting short-term analyses of possible homeland security and traditional mission alternatives employing RC forces, using existing data or models.
- Participating in "red teams" focused on challenging RC roles in homeland security and traditional missions.
- Contributing to working group discussions and deliberations.
- Examining longer-term homeland security and traditional mission/RC issues that the review identified as being in need of further study.

The purpose of this report is to summarize the information we ultimately provided to the review team—in particular, to the Deputy Assistant Secretary of Defense (DASD) for Manpower and Personnel and the other DASDs of the Office of the Assistant Secretary of Defense for Reserve Affairs.

The organization of the report is as follows. The next four chapters correspond to the white papers and accompanying prefaces explaining their context and intent. Following these four central papers, we include an omnibus of selected past RAND research studies relevant for the RC review. We begin with selected summaries of the results of pertinent NDRI (Appendix A), Arroyo Center (Appendix B), and Project AIR FORCE (Appendix C) research.[4] Finally, we present an extensive bibliography of the last 10 years of RAND research on reserve forces. In total, these appendices encompass only areas of particular interest to the sponsor, not all RAND research touching on the reserves. These appendix overviews, excerpts, and summaries are not meant to be exhaustive, nor are they meant to be in-depth analyses of the various connections between these original research projects and the four white papers or the RC review for which the white papers were prepared. Instead, they serve to demonstrate the interests of our sponsor—the information and background OSD sought from us in formulating its comprehensive review.

This document should serve as a useful compendium of our contribution to DoD's exploration of the potential future roles of its reserve forces, as a part of a major reevaluation of the roles of active and reserve forces and their roles and responsibilities vis-à-vis each other.

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[4] Not included in this report are two direct excerpts from a RAND study, B. Rostker et al., *Assessing the Structure and Mix of Future Active and Reserve Forces: Final Report to the Secretary of Defense,* Santa Monica, Calif.: RAND Corporation, MR-140-1-OSD, 1992, that were specifically requested by our sponsor for consideration of proposals under discussion. The excerpts—Appendix C and Appendix F in that study—discuss, respectively, the Army's "roundout" concept to integrate active and reserve soldiers in a single unit and the Air Force's "associate" unit concept, which involves the use of reserve crews to complement an active unit.

CHAPTER TWO

RAND White Paper No. 1
U.S. Strategic Ballistic Missile Defense: Options for Reserve Component Support

K. Scott McMahon, with LTC Stephen Dalzell (U.S. Army), Ray Conley, and Roland Yardley

Preface

Following its withdrawal from the 1972 Anti-Ballistic Missile Treaty in June 2002, the United States announced plans to pursue a variety of strategic ballistic missile defense (BMD) projects that had been prohibited by the treaty. The United States intends to develop a networked system of sea-, air-, land-, and space-based BMD components; the system will require contributions from all of the military services. This prospect affords planners an opportunity to consider new AC/RC force-mix options to operate the defense system. The Army plans to make extensive use of National Guard Active Guard Reserve personnel to operate the Ground-Based Midcourse Defense system. The Air Force is evaluating the future use of Air National Guard personnel to support the first Airborne Laser test aircraft. An option for participation by Naval Reservists could emerge in the future as the Navy experiments with and refines its approach to rotating crews to forward-deployed ships. It seems clear that, with proper and timely training for the BMD mission, RC personnel could support many activities, thus also demonstrating their potential to support other complex strategic weapon systems in the U.S. arsenal. The following paper, prepared in June 2002, pursues these possibilities.

It is now widely recognized that the proliferation of strategic-range ballistic missiles constitutes an emerging threat to U.S. territory. DoD is currently pursuing a diverse research and development program to examine options for a Ballistic Missile Defense System (BMDS) to protect the 50 United States, as well as U.S. territories, military forces, and allies. President George W. Bush's recent decision to withdraw from the 1972 Anti-Ballistic Missile Treaty with Russia permits the development of homeland missile defense options prohibited during the Cold War. We describe potential elements of a future BMDS architecture that could be developed through 2012—the Army's Ground-Based Midcourse Defense, the Navy's Sea-Based Ballistic Missile Defense System, and the Air Force's Airborne Laser—and options for using Active Component (AC) and Reserve Component (RC) manpower to operate and support these future defense systems.

Background

The Bush Administration is currently focusing the strategic elements of its BMDS program on countering limited strikes—by "handfuls of missiles," the Secretary of Defense has

said—and not against massed attacks from Russia or China.[1] For our discussion, we assume that the strategic BMDS's principal mission will be as follows: to counter limited ballistic missile attacks launched by rogue states, or "states of concern," with some capability to counter accidental or unauthorized launches from any source.

To meet the President's objectives, DoD is pursuing a capability-driven acquisition program that aims to transfer BMDS capabilities in block increments to the services for production, deployment, and support. Conceivable homeland BMDS architectures include contributions from the Army, Air Force, and Navy.[2] An initial, limited BMDS for the homeland is sought by 2004. DoD intends to add capabilities over time to provide a "layered" defense.[3] A battle management/command and control network will link BMDS sensors and weapons in a system of systems with the goal of engaging ballistic missiles throughout their phases of flight,[4] thus increasing the defense system's probability of kill against threat weapons.

The Army's Ground-Based Midcourse Defense

In June 2002, DoD began constructing a Missile Defense Test Bed in Alaska. It was the Department's intention that, in a national emergency, the facility could provide a contingency defense capability as early as 2004. However, in December 2002, George Bush signed National Security Presidential Directive 23.[5] The directive ordered DoD to deploy an initial defensive operations (IDO) capability by September 2004. Now the focus of the initial DoD missile defense effort, the IDO will also serve as part of the overall testing capability for the evolving BMDS. The Army will operate a key IDO component: the Ground-Based Midcourse Defense (GMD). The GMD will serve as the first deployed BMDS element capable of defending against strategic-range ballistic missiles.

The key Army assets supporting the GMD system will include some or all of the following:

- Interceptor fields at Fort Greely, Alaska, and Vandenberg Air Force Base (AFB), California
- An early-warning radar site at Shemya, Alaska

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[1] Secretary of Defense Donald H. Rumsfeld is quoted, in Gerry J. Gilmore, "U.S. to Develop, Deploy Ballistic Missile Defense System," American Forces Press Service, June 7, 2001. See also "State's Kelly Says Missile Defense Not a Threat to China," Department of State Press Release, May 16 2001; and "Online Focus: Donald Rumsfeld," *The Online News Hour,* February 14, 2001, available at http://www.pbs.org/newshour/bb/military/jan-june01/rumsfeld_2-14.html.

[2] In this brief overview, we focus on ballistic missile defense capabilities that are mature enough to permit informed speculation on their potential contribution to a future BMDS architecture. We do not consider capabilities that are currently in technology development (e.g., sea- and land-based, boost-phase and space-based, kinetic-energy weapons) or projects slated for potential deployments beyond 2012 (space-based laser).

[3] According to Courier Online (http://courier.stanleyfoundation.org/articles/2001spring5.html, April 2001; last accessed February 23, 2004), "The layered concept of defense is designed to counter missiles with varying ranges. Generally, the upper-tier systems intercept longer-range missiles and the lower-tier systems are targeted at shorter-range systems."

[4] In this paper, we refer to three phases of a ballistic missile's flight. The first phase is the *boost phase,* which occurs after the missile is launched and commences powered flight. The immediate post-boost phase is sometimes referred to as the *ascent phase of flight.* The missile reaches its midcourse phase when it travels through the atmosphere or space on an unpowered, ballistic trajectory. Finally, the missile and/or warhead reenter the atmosphere for the *terminal phase of flight.*

[5] An unclassified fact sheet derived from the directive was released on May 20, 2003. See the White House, "National Policy on Ballistic Missile Defense Fact Sheet," at http://www.whitehouse.gov/news/releases/2003/05/20030520-15.html.

- Fire Direction Centers at Fort Greely, Vandenberg AFB, and Peterson AFB, Colorado Springs, Colorado.

The Army will also maintain a Brigade Headquarters Staff at Colorado Springs.

According to the Army's Space and Missile Defense Command (SMDC), 308 uniformed personnel (295 Army National Guard and 13 Army Active Component) will be required to man the GMD system's radar, interceptor sites, and command and control facilities. Most of the uniformed personnel will be drawn from the existing Army National Guard structure. Roughly one-third of the uniformed personnel will be Military Police for physical security and force protection. As well, a total of 346 civilian and contractor personnel will support the GMD system.

It is possible that the United States will deploy a follow-on GMD site to enhance protection of the eastern United States, but the timing of such a move is uncertain.[6] According to SMDC, a total of 661 uniformed military and 618 civilian/contractor personnel will be required to operate the GMD system if an eastern site is added. The National Guard Bureau's Missile Defense office (NGB-MD) estimates that the GMD will require 661 National Guard and 13 Active Component soldiers if an eastern site is included.[7]

AC/RC Analysis

At first glance, fundamental characteristics of the Reserve Components (items 1–3 following) might appear to make them a poor choice for manning the Army's GMD system. Among the most salient contradictions are (1) filling missions that occur at the far periphery of the country with a geographically based (in own state or region) force, (2) meeting around-the-clock missions with a part-time force, and (3) implementing very military-unique tasks with forces that more often leverage civilian skills for military applications.

However, as the *Reserve Component Employment Study 2005* (RCE-05) indicated, "staffing such a [national missile defense] system with a significant number of RC personnel appears feasible." According to this report, RC manpower is worth considering because the Army's GMD "would be ground-based and would have regularly programmed activities."[8]

To reiterate, the GMD Brigade's approved force design indicates that 295 of 308 (noncomponent Code 4 [Unmanned Units]) authorizations would be Army National Guard in the Active Guard and Reserve (AGR) status. This determination is based on a long-standing Army decision to resource this mission largely from the National Guard. We present here the critical issues for analyzing this strategy and how to implement it.

State Versus Federal Mission. The National Guard Bureau's manning concept for GMD has Guardsmen performing duty on Title 10 (federal military) status and, when off duty, reverting to Title 32 (state status). The main argument for assigning the Army's GMD mission to the Guard seems to be that it is fundamentally a homeland mission and fits within the broad range of Guard missions in that regard. The counterargument would be that there is a difference between homeland security missions that parallel the duties of the

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[6] Bill Gertz, "Pentagon Plans Defense Against Mideast Missiles," *The Washington Times,* December 19, 2002.

[7] Interview of Col. Jack Davis, National Guard Bureau Missile Defense Office, Arlington, Va., by authors, May 7, 2003.

[8] Joint Chiefs of Staff and Department of Defense, *Reserve Component Employment Study 2005: Study Report,* Washington, D.C., June 11, 1999, p. 7.

civilian authorities in a state (e.g., disaster consequence management) and those that parallel national authorities (e.g., defense of national airspace). States do not have jurisdiction over control of airspace, particularly at the altitudes appropriate for GMD. Moreover, any decisions to engage targets would be done at the federal level.[9]

Full-Time Versus Part-Time Manning. The Department of the Army's approved manning solution for the GMD Brigade specifies that all the Army National Guard (ARNG) positions are to be AGR soldiers. Using some type of active-duty personnel would seem appropriate for most of the positions, given the need for rapid responses to contingencies and well-rehearsed procedures. Nevertheless, there are several options for resourcing.

In 2002, NGB-MD evaluated how the GMD system could eventually use trained personnel in an Individual Duty Training status[10] to support operations. Several pieces of the GMD structure could eventually be manned by part-time personnel, among them the Alternate Brigade Fire Direction Center and staff positions within the Brigade Headquarters and Headquarters Battery (e.g., Public Affairs Officer/NCO, Paralegal Specialist, Future Operations Officer, and Readiness Officer/Noncommissioned Officer [NCO]). Positions that are required continuously (e.g., Intelligence and Operations Officers) could also have RC positions to allow for surge operations and relief for absent personnel.

Reserve Versus National Guard. Both the Army Reserve and National Guard leadership seem comfortable with the Guard taking the lead in resourcing the GMD structure. This determination is based largely on an existing agreement that focused the Guard structure on maneuver formations at division and below and the Army Reserve on combat support and combat service support units, particularly at echelons above division. While GMD does not fit strictly into this paradigm, the Guard's resulting strength in air defense structure and personnel, and Military Police, does make it the more logical Reserve Component for most GMD resourcing.

Geographical Constraints. Even though most GMD positions will be located in a few key states, the NGB is confident that it will be able to recruit and relocate enough personnel to fill the required positions, even if doing so means looking nationally across the force.

The Navy's Sea-Based Ballistic Missile Defense

The U.S. Navy's contribution to the IDO system will be ballistic missile surveillance and tracking by one or more Aegis-equipped[11] ships stationed forward in theaters of interest. These ships will use satellite relays to transmit ballistic missile tracking data to the GMD's battle management system.[12] This contribution is intended to enhance the GMD's probability of kill against hostile missiles.

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[9] The Posse Comitatus Act of 1878 regulates the domestic use of the military for the enforcement of civil laws. There is no *Posse Comitatus* issue that would lead one to advocate a National Guard mission as opposed to giving the mission to AC units.

[10] Authorized training performed by members of the RC not on active duty. It may support Active Component missions and requirements.

[11] The Aegis combat system is employed by the U.S. Navy's Arleigh Burke–class destroyers and Ticonderoga-class cruisers. The system manages air, surface, and subsurface combat operations.

[12] Jason Sherman, "Missile Defense: U.S. Navy's Role Soars," *Defense News,* March 3, 2003, p. 10.

In addition to its surveillance support to the IDO, the Navy is developing a theater missile defense system that could defend U.S. territory against shorter-range ballistic missiles launched from ships near U.S. shores.[13] Moreover, the Navy theater system could, in principle, be modified to engage strategic-range ballistic missiles and operate as a stand-alone defense capability or as an adjunct to the land-based system planned for mid-decade. However, unless technical or operational deficiencies derail the planned land-based capability, the United States is unlikely to deploy a stand-alone, sea-based defense system. Instead, a Navy adjunct to the Army's GMD will be pursued to enhance the effectiveness of a ballistic missile defense system by expanding battle space and increasing engagement opportunities.

The Navy has not publicly defined options for an operational, sea-based GMD adjunct beyond the IDO. However, in 2002, the Congressional Budget Office (CBO) reviewed Navy and Defense Department studies and outlined three options for sea-based adjuncts to a GMD system. These options included the following:

- Aegis-equipped ships carrying strategic anti-missile interceptors and linked to the planned BMDS sensor and battle management/command and control network, to engage threat missiles on certain trajectories during the midcourse phase of their flight (i.e., prior to their engagement by the Army's land-based system)
- Aegis-equipped ships with large, specially designed X-band radars, that are forward deployed to further enhance early detection and tracking of threat missiles and support engagements by the land-based GMD
- Aegis-equipped cruisers (i.e., Ticonderoga class) carrying strategic anti-missile interceptors and large X-band radars, to supplement the Army's land-based system or provide defense for U.S. allies and deployed forces.[14]

The Navy and DoD are also looking beyond Aegis and evaluating the potential development of a strategic ballistic missile defense capability for the Navy's planned CG(X)–class cruisers, part of a family of surface combatants to be developed from the baseline DD(X) destroyer.[15] The Navy could develop a CG(X)–class ship that is dedicated to the strategic defense mission. However, in the coming decade, it does not appear that the rogue-state missile threat will evolve to justify such a move. It is more likely that the Navy will pursue a multimission platform that can adapt and respond to changing threat environments. And, it is not clear that a new strategic defense warship, dedicated or not, could be developed to enter the fleet before 2012, or at least not in significant numbers.[16]

This being the case, we assume that the Navy's strategic defense contribution to a BMDS through about 2012 will derive from its legacy fleet of multimission, Aegis-equipped

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[13] Doug Sample, "Pentagon Officials Tell Congress Missile Defense System 'Moving Forward,'" American Forces Press Service, March 21, 2003.

[14] United States Congress, Congressional Budget Office, "Estimated Costs and Technical Characteristics of Selected National Missile Defense Systems," Washington, D.C., January 2002, p. 18.

[15] Department of Defense, "News Release: Navy Announces DD(X) Downselect Decision," April 29, 2002; available at http://www.defenselink.mil/news/Apr2002.

[16] According to the Navy's current plan, the CG (X) will be the last in the new family of surface combatants to be developed. Neil Baumgardner, "Navy Preparing New Expeditionary Strike Force Operational Concept," *Defense Daily*, May 2, 2002.

cruisers and destroyers.[17] The number of platforms needed to perform the GMD adjunct mission would depend on (1) the assigned mission (engage, track, or defend), (2) the size of the area to be defended, (3) the capability of the platform and systems to defend a specified area, (4) the type and/or number of missile threats that the platforms are positioned to defend against, and (5) whether the ships would be on continuous patrol or surged in a crisis. Other factors affecting their ability to perform in an adjunct role would include basing arrangements, maintenance, and personnel-rotation requirements.

For our discussion, we assume that future Aegis platforms with a strategic defense mission will be surge-deployed from forward operating bases to cover threat missile trajectories during any crisis involving a missile-armed aggressor. Rotational deployments from CONUS would augment the ships. For peacetime surveillance operations, homeporting the ships in proximity to threat areas would limit transit times, thereby increasing their operational efficiency. Efficient operations will be particularly important if the Navy is tasked to provide extended, around-the-clock ballistic missile surveillance.

In a 2001 report to Congress, DoD described a sea-based adjunct comprising six "specially configured cruisers" dedicated to the strategic defense mission.[18] Experts we interviewed confirmed that a fleet of six platforms is a likely option for an initial strategic defense capability; six ships would support two ships on-station. This capability could reportedly be achieved in the 2010-to-2012 time frame,[19] or earlier by some accounts.[20] The ships' existing crews would perform ballistic missile defense functions as an additional duty; thus, "new" manpower would not be required.

Around 2012, it is possible that new warships with more-capable sensors and antimissile weapons will begin to come on line. They will likely be multimission platforms and, in keeping with the Navy's concept for the DD(X) family of surface combatants, will require crews that are significantly smaller than those manning existing warships.[21]

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[17] According to an expert we interviewed, the Navy will likely choose to modify Aegis cruisers *and* destroyers for BMD operations, because the destroyers will be more numerous in the fleet through 2012. Using both types of ships will increase the Navy's operational flexibility for BMD missions.

[18] Estimates of the number of ships required for a *stand-alone,* sea-based defense of U.S. territory vary widely. The Heritage Foundation, a nongovernment think tank, has proposed a concept of operations using 22 ships equipped with a total of 650 missiles. The Congressional Budget Office has described a more limited, stand-alone system comprising seven or nine ships carrying a total of 245 or 315 interceptors, respectively. The Heritage proposal is noted in Michael C. Sirak, "White House Decision May Move Sea-Based NMD into Spotlight," *Inside Missile Defense,* September 6, 2000. The CBO estimate is in CBO, *Estimated Costs and Technical Characteristics of Selected National Missile Defense Systems,* Washington, D.C.: U.S. Congress, pp. 14–15.

[19] Robert Holzer, "U.S. Navy Seeks Larger Share of Antimissile Funds," *Defense News,* April 9, 2001, p. 1; and Ann Roosevelt, "Navy Offers Fast, If Fragile, NMD Fix," *Space & Missile Defense Report,* April 12, 2001, p. 1.

[20] According to press reports, DoD is evaluating test data from the Navy's theater ballistic missile defense program to determine whether theater and strategic defense programs can be accelerated. DoD may attempt to field an initial, sea-based theater defense capability as early as 2004. See Greg Jaffe, "Pentagon Could Begin Deployment of Some Missile Defenses by 2004," *The Wall Street Journal,* June 18, 2002.

[21] For example, the Navy's goal is to man the future DD(X)–class destroyers with just 95 personnel, compared with the more than 300 personnel that operate existing Aegis-equipped (DDG Arleigh Burke–class) destroyers. Nathan Hodge, "Chu: Better Crew Plans Can Save Navy Dollars," *Defense Week,* June 3, 2002.

AC/RC Analysis

The capabilities and missions of current Naval Reserve Surface Ships[22] do not permit them to perform a role in the Navy's future strategic defense system: Aegis platforms are not currently in their inventory. As Aegis platforms age, they could become candidates for transfer to the Naval Reserve Force Surface Fleet. However, although six Aegis combatants will be decommissioned by 2006, there are no plans to transfer them to the reserve. In addition, early Aegis platforms that could be candidates for the Naval Reserve Force are not equipped with the necessary Vertical Launching System, and converting them for ballistic missile defense would be very costly. During the 2010-to-2012 time frame, the Aegis platforms with ballistic missile defense capability are posited to be in the Active Surface Fleet.

An option for RC involvement in the ballistic missile defense mission could evolve as the surface Navy experiments with and refines its approach to rotating crews to forward-deployed ships.[23] Under current practice, a single crew deploys with a ship for the entire length of its deployment. However, after extended commitments to support Operation ENDURING FREEDOM, the Navy is reviewing the way ships and crews are deployed; it is experimenting with swapping crews while keeping a ship on-station in a forward-deployed area.[24] A benefit of rotating personnel to ships is that the presence-time (the time devoted to a mission) per ship increases as transit-time requirements decrease. And although the submarine fleet has used crew rotation as its standard method of operation, the surface Navy has just begun to experiment with this option and evaluate the benefits and trade-offs.

If a crew-rotation option is pursued, RC personnel (with appropriate skills and training) could become part of a pool of personnel that would be rotated to forward-deployed Aegis platforms, where they would perform alongside active-duty counterparts in support of the ballistic missile defense mission. Further development of this option would include plans to train and integrate RC personnel in the systems and equipment of Aegis platforms supporting the BMDS mission.

The Air Force's Airborne Laser Ballistic Missile Defense

The Air Force is currently developing an Airborne Laser (ABL) with a capability to detect, acquire, track, and destroy ballistic missiles during the boost phase of their flight. This program aims to integrate a megawatt-power chemical oxygen iodine laser onto a Boeing 747-400.

The Air Force plans to deploy an ABL fleet for theater missile defense missions. Production decisions have not been made, but the Air Force is currently planning and programming according to a schedule that will result in seven operational aircraft in 2011. A six-man crew would operate each aircraft; a second crew could be used to augment the first crew during long-duration missions. An ABL squadron will be capable of maintaining multiple combat air patrols and nearly 24-hour coverage of suspected theater missile launch areas. The

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[22] The Naval Surface Reserve Force is made up of eight Guided Missile Frigates, one Tank Landing Ship, one Mine Countermeasures Command Ship, five Countermeasure Ships, and ten Coastal Minehunters.

[23] David Brown, "Underway Relay: New Plan Could Revolutionize the Way Sailors Deploy," *Navy Times*, April 1, 2002, p. 14.

[24] Hodge, "Chu: Better Crew Plans," 2002.

aircraft will be permanently based in the continental United States (CONUS) and will be integrated into an existing USAF wing structure. Air Combat Command's (ACC's) Airborne Laser Special Management Organization described the maintenance concept for the ABL squadron in the following way:

> The ABL will be supported by a two level maintenance concept. Organization-level maintenance will be performed on the aircraft at its permanent CONUS base or, if deployed, at the FOL [forward operating location]. Back-shop organizational support will be provided by an already existing maintenance squadron with ABL manpower augmentation. Depot level maintenance will be performed at an Air Force air logistics center or at an equivalent contractor facility or a combination of both. The maintenance concept will be consistent with Air Force maintenance (ACCI 21-101, Objective Wing Maintenance Concept) and depot management policies/guidance using existing Air Force specialty codes (AFSC) and maintainable by personnel at a skill level 5. Due to the hazardous nature of the chemicals on the ABL, ground support crews with specific ABL aerospace ground equipment are required to service and monitor the ABL on the ground whenever it is loaded with chemicals. During combat operations, this will be a 24-hour a day maintenance operation.[25]

Table 2.1 summarizes ACC's preliminary estimate of the manpower required to sustain a seven-aircraft ABL squadron in 2011.

In 2002, DoD designated ABL as an air-based element of the BMDS's boost-phase defense component and directed the program to further develop the ABL for strategic and theater missile defense missions. It appears that the same weapon system developed for theater applications can be applied to strategic defense missions.

The ABL Program Office plans to attempt the first intercept test against a boosting ballistic missile target in 2005. Thereafter, the Bush Administration may decide to employ the ABL test-bed aircraft as a limited operational system, usable in the event of an emergency.

The ABL's role in the emerging BMDS will be driven primarily by technology development and by budgets. The DoD has not made a decision on the future size of the ABL fleet, but ACC officials assume that the future fleet will continue to organize by squadron. Moreover, the strategic, long-range missile defense mission will likely remain focused on

Table 2.1
Preliminary Estimate of ABL Squadron Operations and Support Personnel

Requirement	Number of Personnel
Aircrew	90
Operations Staff	105
Weather	10
Maintenance Staff	10
Maintenance Squadron	349
TOTAL	564

[25] USAF, Air Combat Command, Airborne Laser Special Management Organization, *Airborne Laser Manpower Estimate Report (MER)*, Langley Air Force Base, Va., April 2002, p. 7.

countering attacks by rogue states, not on defending against Russian or Chinese strategic missile attacks. Future ABL capability will comprise one or more squadrons, based on the number of aircraft required to meet the threat against U.S. troops and interests at home or abroad. One squadron could provide adequate coverage of relatively small theaters, such as Korea, and two would be required to cover larger theaters, such as Iran.[26] We assume that, at most, one squadron of seven aircraft will be deployed by 2012. Production capacity and budget constraints will likely push additional procurements beyond 2012.

AC/RC Mix Analysis

Current ABL plans do not include RC participation. However, in 2003, ACC evaluated the use of Individual Mobilization Augmentees (IMAs)[27] from the Air National Guard to man the first two ABL test aircraft (one planned for completion in 2004 and the next in 2008). These reservists could support test operations and provide surge manpower for deployments.[28] In addition, the Air Force is developing a Future Total Force Unit[29] concept that could be used for the ABL mission. Two examples are described here to illustrate current and potential AC/RC models.

The Air Force's 513th Air Control Group—a Reserve Associate Airborne Warning and Control System (AWACS) unit at Tinker AFB—is an existing model for RC participation in a top service mission. In this case, the active-duty forces actually own the aircraft, and the reserve unit provides both aircrew and maintenance support for the Air Force's operational inventory of Boeing E-3 "Sentry" aircraft. Reserve aircrew members fly as part of an active-duty crew or with an all-reserve crew. Associate units also provide aircraft maintenance personnel to maintain the aircraft.

The Air Force established the 116th Air Control Wing at Robins AFB, Ga., in October 2002. The 116th is the service's first Future Total Force Unit. By 2004, the unit expects to operate a fleet of 17 Boeing E-8C Joint Surveillance and Target Attack Radar System (JSTARS) aircraft. According to an official with the 116th, the new Air Control unit features a wing-wide blend of Active Component and Air National Guard (both full-time and part-time) manpower. The Air National Guard and Air Combat Command are currently evaluating key issues for this new model, including apportioning unit assignments between AC and Guard personnel, rank structure, and command billets.

The 116th is commanded at present by an Air National Guard officer in Title 32 status. His Vice Commander, a Title 10 officer, handles certain Title 10 issues for the 116th while options for long-term Title 32–Title 10 command relationships are evaluated by the Air Force. According to an official with the 116th, one option under evaluation would main-

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[26] An ACC official we spoke to said that the original concept of operations (CONOPS), envisioning a seven-aircraft squadron to cover any single theater, was budget-driven, rather than capabilities- or threat-driven. The official and his staff were not aware of studies or analysis supporting the squadron size. Indeed, in their view, a seven-aircraft fleet could cover relatively small countries, such as North Korea, but would be insufficient to provide adequate coverage of a larger state, such as Iran. The official said further that he believed that the USAF had originally sought two ABL squadrons to accomplish the theater missile defense mission but that budget constraints dictated a reduction to a single squadron.

[27] IMAs are members of the Selected Reserve not attached to an organized reserve unit. IMAs are assigned to Active Component organizations to fill billets required shortly after mobilization.

[28] Maj. David J. Pohlen, Air Combat Command ABL Current Plans Branch, Va., interview by authors, March 19, 2003.

[29] This concept is intended to better integrate Active and Reserve Component units—for example, by bringing together active and reserve personnel under one commander.

tain the unit's Commander in Title 32 status and provide him with the Title 10 authority required to command Active Component forces. Of course, statutory changes will be required to permit a Title 32 commander to obtain Title 10 authority, and the Air Force is seeking congressional support for such changes.[30]

According to one press account, the Air Force may face challenges in its Future Total Force Unit approach for the JSTARS mission. The E-8C is a heavily tasked asset; thus, it could require part-time Guardsmen to commit to lengthy missions.[31] However, this tasking concern might not carry over if the Future Total Force Unit model is applied to the ABL. According to ACC officials, the ABL will be permanently based in CONUS, and it is likely to be deployed just in time to theaters for missile defense missions.

Conclusion

In the absence of ABM Treaty constraints, the United States intends to pursue a wide-ranging program to develop strategic and theater BMDS components. Some components are mature enough to identify today; new components will likely mature within a decade.

With respect to manning concepts, AC/RC mix considerations will be strongly driven by the pace and scope of technical development for weapon, sensor, and command and control systems—for many of which there is substantial uncertainty—and by the future mix of systems dedicated to homeland defense and those usable for homeland defense missions but also deployable for conflicts abroad. However, our assessment is that Reserve Components from each of the services could play a role in the future BMDS, and such support may require statutory changes.

One significant attribute of the strategic BMDS mission is that key assets will operate in or from U.S. territory, which will make the mission more amenable to staffing by part-time military personnel. However, the accelerated schedule for BMDS deployments makes it imperative that training and resourcing issues be managed in a timely fashion. Failure to include the RC in BMDS development and training could compel the services to develop intense training regimens to ensure that RC personnel will be prepared to operate deployed BMDS components.

There could be additional opportunities for RC support if new weapon systems or operational concepts emerge in the future, as the BMDS matures. Moreover, if RC manning for the BMDS proves effective, the experience could prompt consideration of RC support to other complex U.S. strategic weapon systems.

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[30] Amy Butler, "Guard Hopes to Assume JSTARS Mission by October, Two Years Early," *Inside the Air Force,* May 24, 2002.

[31] Butler, "Guard Hopes to Assume JSTARS Mission," 2002.

CHAPTER THREE

RAND White Paper No. 2
Homeland Security

Eric V. Larson and Ray Conley

Preface

The events of September 11, 2001, demonstrated that even as the threat of strategic nuclear attack by missiles and bombers has declined, new adversaries have emerged who may be equipped with weapons of mass destruction (WMD) and innovative concepts for employing them. Such adversaries could use the United States' own transportation networks as avenues of attack. This paper, prepared in June 2002, provided the Office of the Assistant Secretary of Defense (Reserve Affairs) a think piece regarding the prioritization, apportionment, and mission assignment of forces for homeland security (HLS). Five issues are discussed: prioritization of HLS mission areas; apportionment of forces and mission assignment; ensuring HLS while preserving other capabilities; making civil support capabilities available quickly; and consideration of major factors in developing Active/Reserve Component policies for homeland security.

The paper was written while the framework of homeland security and homeland defense was still evolving. Less than nine months had passed since the events of September 11th demonstrated that the United States had lost the sanctuary that had been afforded by its enviable geographic circumstances. Less than two months had passed since the Secretary of Defense released the 2002 Unified Command Plan, which included provisions for Northern Command (NORTHCOM), the ninth unified command and the first-ever assignment of the continental United States to a combatant commander. NORTHCOM was given responsibility for homeland defense and for helping the Defense Department better deal with natural disasters, attacks on U.S. soil, and other civil difficulties. NORTHCOM was also made responsible for coordinating military support to civil authorities, such as the Federal Bureau of Investigation (FBI), the Federal Emergency Management Agency (FEMA), and state and local governments.

Finally, we should note that the paper was written seven months before the Department of Homeland Security was established with the swearing in of its first Secretary.

Issues

What should the prioritization of HLS missions be? How can apportionment and mission assignment best proceed? How can homeland security and other vital capabilities for the Total Force (active and reserve forces) best be ensured? With respect to civil support, is there a concept whereby capability can be made available quickly on a short-term basis? What

major factors should be considered in developing policy for the active/reserve mix with respect to homeland security?

Background

The Joint Chiefs of Staff (JCS) and the services have proposed that homeland security be broken into two subordinate collections of mission areas: homeland defense (HLD) and civil support (CS).[1] Proposed definitions have been provided (but as yet not accepted by OSD) for each, as follows:

- *Homeland security* is defined as the preparation for, prevention of, deterrence of, preemption of, defense against, and response to threats and aggression directed toward U.S. territory, sovereignty, domestic population, and infrastructure, as well as crisis management, consequence management, and other domestic civil support.
- *Homeland defense* is defined as the protection of U.S. territory, sovereignty, domestic population, and critical infrastructure against *external* threats and aggression.[2]
- *Civil support* is defined as Department of Defense support to U.S. civil authorities for domestic emergencies and for designated law enforcement and other activities.[3]

More recently, in his May 7, 2002, testimony during the Senate Appropriations Committee's hearings on homeland security, Secretary of Defense Donald Rumsfeld distinguished between homeland defense and homeland security as follows: homeland defense consists of providing forces to conduct traditional military missions under extraordinary conditions, such as the defense of a nation's airspace or its maritime approaches, while homeland security consists of supporting the broader efforts of the federal domestic departments and agencies, and state and local governments. Thus, it may be that OSD is envisioning use of the term "homeland security" not as the overarching term JCS did, but as a substitute for what was previously called "civil support."

After reviewing testimony and other sources, we can identify the main mission areas that need to be considered in homeland defense and civil support. In the following section, we look at points to be considered in addressing the issues covered in this paper: prioritizing the mission areas that have been identified, taking into account surge operations, planning

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[1] More recently, there have been some indications both that OSD may not accept these definitions as written and that a third mission area, emergency preparedness (EP), may be added. Although we do not have any further information on what might be entailed in the EP mission area, this mission could be problematic: Preparedness measures arguably could be undertaken in most of the discrete HLS mission areas.

[2] Note that the inclusion of the term "external" is problematic in the sense that it would seem to exclude, for example, air sovereignty operations directed against such internal threats as those that arose on September 11th.

[3] OSD used a similar definition in the October 16, 2001, homeland security execution order (Secretary of Defense, HLS SECDEF EXORD, October 16, 2001):

> HLS is the preparation for, prevention, preemption, deterrence of, and defense against, aggression targeted at US territory, sovereignty, domestic population, and infrastructure; as well as the management of the consequences of such aggression; and other domestic civil support. HLD is the protection of US territory, domestic population, and critical infrastructure against military or terrorist attack emanating from outside the US. CS is DoD support to US civil authorities for natural and man-made domestic emergencies, civil disturbances, and designated law enforcement efforts.

for short-term requirements, planning for longer-term requirements, and how to determine the importance of one mission area to another; apportioning forces for homeland security missions; ensuring homeland security while preserving other capabilities; and making civil support capabilities available quickly. We then discuss key factors to be considered in developing policies for AC/RC force mixes for homeland security. We then discuss developing options to deal with these issues and recommend ways for the OSD to approach the issues.

Addressing the Issues

Prioritization of HLS Mission Areas

In many important ways, the national response to the attacks of September 11 reflected a lack of prioritization: A wide variety of efforts—both civilian and military—were funded to plug the many security "holes," or vulnerabilities, that arise within an open society such as the United States. However, which vulnerabilities are the most urgent or pervasive were never determined clearly.

In prioritizing HLS missions, it is important for OSD to consider four main points:

1. The variety and complexity of the discrete mission areas involved (see Table 3.1) make it necessary to consider the HLS portfolio in its totality, so that important areas are not neglected.
2. The capacities of different governmental/geographic entities need to be considered in sizing DoD capabilities. In many (if not most) cases, local, state, or federal civilian actors—and private-sector actors who invest in security improvements—will make critical contributions in earlier layers of the layered defense; DoD planning needs to be predicated upon what these earlier layers reasonably can (and cannot) do. In a similar vein, there may be substantial local civilian capacity for both public- and private-sector consequence management activities that can be drawn upon in the aftermath of an incident.
3. Certain capabilities and activities (e.g., those that contribute to detection and neutralization of weapons of mass destruction) may benefit multiple mission areas.
4. The demands of the past eight months of post–9/11 surge in operations will probably look very different from both emerging short-term and longer-term HLS needs. Because this last point informed our prioritization of HLS mission areas, we focus particular attention on it, describing some of the ways in which we think HLS demands will change.

Post–9/11 Surge Operations. Post–9/11 DoD HLD efforts included the following: 24-hour-a-day, 7-days-a-week (24/7) combat air patrols and heightened strip alerts to better

Table 3.1
A Taxonomy of Homeland Security Mission Areas

- HOMELAND SECURITY (HLS)
  - HOMELAND DEFENSE (HLD)
    - Sovereignty Operations
      - Air Defense/Sovereignty
        - Air Warning
        - Air Control
      - Maritime Defense/Sovereignty
        - Port Security
        - Maritime Surveillance and Patrol
      - Land Defense/Sovereignty
        - Border Security
        - Defense of High-Value Targets
      - Missile Defense
    - Continuity of Military Operations
      - Force Protection
      - Critical Infrastructure Protection
      - Critical Asset Assurance Program
      - Information Operations (IO)/Computer Network Defense
    - Continuity of Operations
  - CIVIL SUPPORT (CS)
    - Military Assistance to Civil Authorities
      - Military Assistance in Civil Disturbances
        - Civil Disturbances
        - WMD Crisis Management
      - Military Support to Civil Authorities
        - Natural Disaster Responses
        - WMD Consequence Management
        - National Security Special Events (NSSE)
        - Continuity of Government
      - Military Assistance to Law Enforcement Agencies
        - Assistance in Maritime Security
        - Assistance in Border Security
        - Assistance in Aviation Security
        - Counterdrug Operations
  - EMERGENCY PREPAREDNESS (EP)

SOURCES: Testimony by Secretary Thomas White, General Peter Pace, General Ralph "Ed" Eberhardt, and General William Kernan [before the Senate Armed Services Committee, October 25, 2001; Eric V. Larson and John E. Peters, *Preparing the U.S. Army for Homeland Security: Concepts, Issues, and Options,* Santa Monica, Calif.: RAND Corporation, MR-1251-A, March 2001; Eric V. Larson et al., ***Persistent Awareness, Immediate Response: Framing the Air Force Role in Homeland Security,*** Santa Monica, Calif.: RAND Corporation, MG-182-AF (forthcoming) (FOUO).

protect domestic airspace;[4] deployment of Guardsmen to enhance security at more than 422 of the nation's largest commercial airports and at the nation's borders;[5] increased patrolling of the nation's 361 ports and littoral waters by the Coast Guard and the U.S. Coast Guard Reserve (and, to a lesser extent, the Navy); and protecting of other critical infrastructure (e.g., nuclear power plants, hydroelectric dams, telecommunications nodes, and chemical facilities).[6] The Force Protection Condition (FPCON[7]) for DoD bases and other installations also increased, resulting in both heightened security measures and additional investments at military installations.[8]

Following 9/11, civil support activities generally focused on consequence management assistance to New York City and, to a lesser extent, at the Pentagon; operations in support of the continuity of government (COG) mission were also prominent in the wake of the attacks. Since 9/11, the DoD also has supported a number of high-profile National Security Special Events (NSSEs), including the Super Bowl in New Orleans and the Olympics in Salt Lake City, that have involved predeployment of WMD-related response capabilities, conduct of combat air patrols, and other activities. Most of these activities seem to have tapered off, although COG operations appear to have continued.

Short-Term Planning Considerations. On the civilian side, a wide range of investments continue to be made in related areas, such as improving civilian aviation security[9] and hiring additional civilian border security personnel. As a result, we expect that the Guard personnel who have been providing enhanced security for airports, nuclear facilities, and other critical civilian infrastructure will continue to be replaced by civilian security personnel. In the short-term, then, we are thus approaching a new—and as yet somewhat ill-defined steady-state level of effort for homeland defense operations in which air

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[4] Of the $7.8 billion for HLS-related activities of DoD/Intelligence Community in the President's Budget request, $1.3 billion was earmarked for maintaining combat air patrols within U.S. airspace.

[5] According to press accounts, the Federal Aviation Administration initially asked for about 5,000 troops to help guard airports; Army data suggest that 7,036 Guardsmen were on duty in airports on January 1, 2002. See Master Sgt Bob Haskell, Special to the American Forces Press Service, "National Guard Steps in to Help with Airport Security," American Forces Information Service, News Articles, October 8, 2001 (available at http://www.defenselink.mil/news/Oct2001/n10082001_200110083.html; last accessed March 23, 2004); and Jon Powers and Robert Stephenson, "On Guard in America: The National Guard Provides Homeland Defense," *National Affairs,* March 2002 (available at http://www.findarticles.com/cf_0/m1272/2682_130/84184861/print.jhtml; last accessed March 23, 2004). More-recent data suggest that the number subsequently fell to 6,500. This mission ended in May 2002.

[6] George W. Bush, *Securing the Homeland, Strengthening the Nation,* Washington, D.C., 2002, p. 25. Currently, plans are for about 1,500 Guard members to enhance security at U.S. borders—about 700 at the U.S.-Canadian border, the rest presumably at the U.S.-Mexican border.

[7] "A Chairman of the Joint Chiefs of Staff–approved program standardizes the military services' identification of and recommended responses to terrorist threats against U.S. personnel and facilities. This program facilitates interservice coordination and support for antiterrorism activities and is called FPCONs." See "Terrorist Force Protection Condition (FPCON)," in *Force Protection Condition Definitions—Content Frame,* available at http://www.eucom.mil/directorates/ecpa/news/FPCON.htm, last accessed February 23, 2004.

[8] We understand that substantial resources were devoted to the various mission areas collected under "continuity of military operations," but we have seen few specifics beyond the fact that more than half ($4.6 billion) of the President's Budget request for $7.8 billion for homeland security–related activities of DoD and the Intelligence Community is dedicated to the physical security of DoD facilities and personnel inside the United States.

[9] These improvements have included public- and private-sector investments in upgraded passenger threat information, passenger and baggage screening, hardened cockpit doors, air marshals, and improvements to FAA and North American Air Defense Command (NORAD) warning and communications systems.

defense operations, security detachments at airports, and other activities are reduced—or have ended.[10]

As a first step, it will be important for OSD to clarify what the HLS workload is likely to look like over the next 6 to 12 months and what forces and other capabilities will be needed for sustaining HLS steady-state operations, and to provide for HLS crisis response.

Of the sovereignty missions, it appears to us that the port and maritime security missions of the Coast Guard (and especially its reserve) seem least likely to be substantially reduced; the Coast Guard is now intercepting and interrogating commercial maritime traffic outside U.S. ports; it is expected to continue this mission for the foreseeable future. It also seems likely that the discrete mission areas under continuity of military operations may continue at a higher steady-state level than what prevailed before 9/11, as bases and other installations seek to reduce their vulnerabilities through improved perimeter security, computer network defenses, and other activities. Of the civil support missions, it seems likely that continuity of government, which has atrophied since the end of the Cold War, may have achieved increased salience, and that NSSEs may be declared with greater frequency, thus placing more-frequent demands on the force.

Longer-Term Planning Considerations. DoD has extensive experience in many (or most) of the mission areas described in Table 3.1, or has invested in new capabilities in selected new areas in recent years (e.g., WMD consequence management, computer network defenses). It seems most likely to us that certain areas—e.g., maritime and airborne surveillance of border and coastal areas, which are largely conducted for counterdrug purposes—might see substantial increased emphasis. Such areas also could easily be broadened to include additional maritime, airborne, or space-based intelligence, surveillance, and reconnaissance (ISR) capabilities that can better detect smuggling of nuclear or radiological weapons into, or movement of such weapons within, the country.[11] We would expect that this broadening could lead to additional demands on the military and that many of these missions could fall to the RC.

In the longer term, it will be important to ensure a more efficient use of resources by investing in forces and capabilities in areas where gaps in civilian capabilities, such as infrastructure protection or weapon detection—including those found in both the public and private sectors—are likely to remain even after currently envisioned investment is made in such capabilities, and where military capabilities can make the greatest difference. More thorough study is needed regarding the nature, scope, and scale of the residual demands that may be placed on state and federal military forces, and what might constitute an optimal mix of local, state, and federal civilian and military capabilities to prevent or mitigate the consequences of different types and magnitudes of threats.

Such studies may suggest that it is necessary to make further adjustments in apportionment, mission assignment, state and federal military roles, and AC/RC mix to ensure the needed responsiveness, capacity, and cost-effectiveness in the military capabilities that will be

[10] Air defense operations are currently being reduced, and the Air and Army National Guard presence at airports is due to end at the end of May 2004; the assignment of Guard troops to assist in border security is expected to last about six months, suggesting that the mission will be concluded by the end of fiscal year 2004.

[11] We expect that substantial Research, Development, Test, and Evaluation (RDT&E) efforts might be required to field remote-sensing capabilities that could detect nuclear and radiological weapons from a distance, however.

provided for HLS.[12] Wherever it is possible to do so, DoD also should take an "all hazards" philosophy, in which the greatest possible benefit is derived from HLS-missioned assets by cross-training and cross-equipping those assets for as wide a range of HLS missions as is practicable;[13] it also may be possible for units to perform HLS-related tasks as a part of their training cycles.

Relative Importance of the Mission Areas. Given the just-described assumptions about how demands might change, we now identify what we believe to be the four highest-priority HLS mission areas, describe why each is important, identify what factors are associated with the accomplishment of each, and identify the main characteristics of the RC that would suggest that it might play a larger, smaller, or different role in each.

Sovereignty Missions. Sovereignty operations (especially air, maritime, and land defense) are critical, because they can protect the United States from present-day and emerging external and internal threats. The probability that no attackers will leak through a layered defense to their targets is the principal measure of effectiveness for these operations.[14] This probability hinges, in turn, on the maximum distance at which a threat—especially nuclear weapons and fissile materials—can be reliably detected and neutralized.[15] Of particular interest are early-warning capabilities that can provide detection at a substantial distance (e.g., >500 nautical miles) from the nation's coasts and borders, or anywhere within U.S. borders, thereby providing the warning time needed to initiate an effective response that can either prevent an attack or mitigate its consequences. Warning capabilities are provided by space-based, airborne, maritime, and terrestrial sensors and are integrated with layered defenses consisting of maritime, airborne, and ground-based components that can provide for crisis response and terminal defense of targets, all integrated with civilian agencies that have responsibilities in this area (e.g., the Federal Aviation Administration, Customs, Secret Service).

Emphasis should be placed on improving early-warning capabilities for detecting HLS threats, especially nuclear weapons. Such capabilities could be attained through enhanced air, space, maritime, and land surveillance, which might leverage counterdrug intelligence, surveillance, and interdiction (including maritime patrol) efforts in which RC capabilities already play a very substantial—and, in many cases, growing—role.[16] And, although continental air defense forces for a number of years have come predominantly from the Air National Guard (ANG), it will be important for NORTHCOM (and DoD) to consider alternative joint/interagency concepts of operations (CONOPS) that can provide more-

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[12] We discuss these longer-term issues in greater depth in the sections on options and recommendations.

[13] For example, platforms and other capabilities for counterdrug efforts might be adapted to also provide for WMD detection, monitoring, and interdiction; many assets made available for NSSEs may be critical contributors in WMD consequence management.

[14] Beyond the effectiveness of the layered defense, cost-effectiveness and total cost also should be considered in the context of a comprehensive risk analysis; as well, the marginal costs of potential improvements in effectiveness and affordability will be important.

[15] This detection capacity includes the ability to detect threats, especially WMD, from a distance, whether they are within or outside the United States.

[16] For example, 35 percent of the Navy's maritime patrol squadrons are in the Naval Reserve, and the RC role in intelligence is substantial (e.g., military intelligence capabilities that reside in the ARNG) and has recently been growing. RCES-05 follow-on studies concluded that the ARNG has the potential to increase its role in counterdrug operations if funds are available.

effective (and cost-effective) layered air defenses through different mixes of military and civilian capabilities; these CONOPS alternatives could result in some changes as well.[17]

Continuity of Military Operations. September 11 revealed the vulnerability of military headquarters (the Pentagon) to catastrophic attack. Accordingly, we view continuity of military operations (including force protection, critical infrastructure protection and critical asset assurance programs, cyber defense, and continuity of operations) as vital. Such operations are essential to ensuring the availability of military capabilities to mobilize, deploy, and sustain military operations, whether at home or abroad. Although WMD attacks against military targets at home still seem to be relatively low-probability events, both the threat and risk of surprise have been growing; cyber attacks also seem to be increasing.[18] The key measure of effectiveness is the ability to sustain military operations in the face of an attack or to restore military capability that is lost as a result of an attack.[19] As with sovereignty missions, of interest are capabilities for detection and neutralization of threats at a safe distance from the targeted U.S. installation or other target, as well as the time needed to restore lost military capability following attacks of various types and magnitudes.

The RC has many of the relevant capabilities for these mission areas, and it is easy to imagine that RC responsibilities could increase here. The post–9/11 call-ups included significant numbers of Military Police, infantry, security, intelligence, criminal investigation, and special operations personnel, for example. The RC has also recently increased other capabilities, such as its computer network defense. It is not clear to us how such RC capabilities can best be integrated into base security without placing further stresses on the RC personnel in these specialties, who have been very busy in recent years.

WMD Terrorism Incident Management. Because of the growing threat from chemical, biological, radiological, nuclear, and high-yield explosive (CBRNE) weapons, WMD terrorism incident management capabilities (including both crisis and consequence management)—especially those related to nuclear weapons, because of the promptness and magnitude of the consequences of such incidents—are also critical. In turn, many of the same sorts of capabilities for detection and prevention related to sovereignty and continuity of military operations are of interest in this mission area. But DoD capabilities to support crisis management (for which the Federal Bureau of Investigation is the Lead Federal Agency, or LFA) and consequence management (for which the Federal Emergency Management Agency is the LFA) also are of interest. The key measure of effectiveness is the reduction in harm that otherwise would result from an attack, which depends upon both prevention (e.g., the probability of no leakers to the target) and response capacity (e.g., how much of the shortfall in needed capabilities the military can provide after available state, local, and civilian agencies' likely capacity for consequence management has been netted out).

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[17] For example, such a CONOPS could involve heavier reliance on ARNG (or even civilian) air defense capabilities, at least when terminal defenses would be justified to defend especially high-value targets (such as the National Capital Area). Of the Army's air defense battalions, 48 percent are in the ARNG, as are 25 percent of the air defense brigades. A joint/interagency CONOPS for air defense might seek to knit together DoD air-, sea-, and land-based air defenses; civilian agencies, such as the FAA and U.S. Secret Service; and quasi-voluntary organizations, such as the Civil Air Patrol.

[18] The number of attacks on U.S. computer networks has been doubling each year, for example. However, it is often difficult to differentiate the hype from the actual threat in this area.

[19] Cost-effectiveness and total cost also will be important factors in considering options.

Substantial efforts have been undertaken in recent years to increase the RC's capabilities in dealing with WMD terrorism. For example, 32 ARNG WMD Civil Support Teams have been funded to date,[20] and 25 Army Reserve chemical units have been cross-trained for casualty decontamination in domestic incidents; substantial amounts of the Air Force's aerial spraying and firefighting capabilities reside in the RC; the Coast Guard Reserve provides both specialized port security elements (for detection and interdiction) and environmental hazard response strike teams that may be useful in chemical or biological terrorism incidents;[21] the Air Reserve Component is responsible for providing patient decontamination during consequence management following a domestic WMD event; and substantial medical capabilities exist in RC units in the Army and Air Force. Some of these units (e.g., Army Reserve chemical units or medical doctors) are also dual-tasked to warfighting or to backfilling active forces who deploy on certain missions.

Continuity of Government (COG). Planning and preparations for national-level COG have atrophied somewhat since the end of the Cold War, failing to keep pace with emerging threats. For example, the September 11th attacks included a conventional attack on the Pentagon and what appears to have been an aborted attack on the presidential compound. And in October 2001, letters containing anthrax spores were mailed to a select group of congressional leaders and to others. According to press reporting the machinery for COG that was used in response to these events did not work particularly smoothly.[22]

The key measure of effectiveness for COG is the ability to sustain critical governmental activity and restore full activity in a timely manner. Obviously, many of the same issues related to the detection and neutralization of WMD and other threats also apply here, but COG also can include evacuating leaders to secure remote sites, at which the federal government's business can continue to be conducted, and sustaining or restoring communications. Although the COG mission may involve only small numbers of military personnel, it seems likely that it will grow in importance. It is not clear how much of the COG mission is (or might be) provided for by RC capabilities or whether the nature of the RC commitment to COG will need to change in the future.

Apportionment and Mission Assignment

Apportionment of forces for planning for homeland security missions has taken on increased importance in the wake of September 11, although most of the issues of apportionment and mission assignment for HLS are unresolved at present.

It is easy to imagine that a future adversary will seek to complicate the deployment and sustainment of U.S. forces in a conflict by attacking military and/or civilian targets in the United States; it also is easy to imagine other actors acting in sympathy with a future adversary, either attacking targets that can erode military operations or attacking civilian targets to tie up warfighting forces with homeland defense or consequence management tasks. The most recent QDR makes it clear that force planning will be predicated upon the possibility

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[20] The preceding administration envisioned creating a total of 54 WMD Civil Support Teams, one for each U.S. state and territory; the current administration does not seem to have embraced this objective, however.

[21] Of the Coast Guard's billets in deployable Port Security units, 98 percent reside in the Coast Guard Reserve.

[22] See Rob Portman, Congressman, "Congress Working on Continuity of Government," October 7, 2002, at http://www.house.gov/apps/list/speech/oh02_portman/col100702.html; and Dana Milbank, "Worst-Case Scenario: The U.S. Has None; Constitutional Crisis, Chaos Foreseen If Top Leaders Killed," *The Washington Post,* December 10, 2001, p. A1.

of simultaneous operations at home and abroad, where U.S. bases of operation need to be protected.

In considering homeland security, DoD will need to avoid the error it made in the past decade regarding smaller-scale contingencies (SSCs): During the 1990s, SSCs were considered to be "lesser-included cases" that could be met with capabilities developed for major theater wars (MTWs). As with SSCs, HLS missions could increasingly become competing claimants for scarce DoD resources, resulting in higher-than-desirable operational and personnel tempos, and other undesirable force-management consequences that have been associated with SSCs. Thus, care will need to be taken to ensure that sufficient forces are available and that they are deconflicted (management of dual-missioned forces is sometimes referred to as "deconfliction"), in ways that ensure that NORTHCOM and outside the continental United States (OCONUS) combatant commander operational plans are not relying upon the availability of the same units. Otherwise, dual-tasking could create force apportionment and allocation dilemmas in the event of simultaneous incidents abroad and at home.

An important question related to apportionment of forces is: Which standing forces will be permanently assigned to NORTHCOM and which are expected to come from other force providers, so that NORTHCOM may have to compete with other combatant commanders for those forces? With respect to mission assignment, NORTHCOM's regional tasks will, like the other combatant commands, include warfighting missions that translate easily into the homeland defense mission areas described in Table 3.1; evacuation of Americans in danger within its area of operations (e.g., Mexico, some Caribbean islands, and Canada); and military-to-military relations, especially with Canada, which is a partner in NORAD but has not as yet agreed to cooperate in other homeland security areas, and with Mexico, which is not party to any NORAD-like treaties. But NORTHCOM will also be heavily involved in civil support activities, which do not, strictly speaking, fit easily under the category of warfighting, and it will need to cultivate a wide range of relationships—with mayors, state emergency services heads, adjutant generals, and governors—to ensure an efficient use of resources, interoperability, and a high probability of an effective response.

In the end, then, the apportionment and mission assignment of forces should be done according to both the relative priorities that are to be given to each of the individual HLS mission areas, simultaneous consideration of the ever-present competition between warfighting and homeland security needs, and the relative responsiveness and capabilities of AC and RC forces. However, given the substantial role of RC elements in a variety of tasks that are related to HLS—WMD consequence management, counterdrug operations, intelligence, firefighting, medical support, and medical evacuation—further study of the apportionment and mission assignment of additional RC forces for HLS would appear to be advisable.

Ensuring Homeland Security While Preserving Other Capabilities

Homeland security will demand capabilities both for crisis response that can be surged in the event of a threat or incident (or, in the case of NSSEs, a scheduled event) and for capabilities for sustaining a steady-state level of commitment to ongoing HLS operations.[23] In many respects, this problem appears to be little different from the problem of providing crisis response and rotational capabilities for overseas deployments, with the possible exception

[23] Planning also will need to consider the needs of upcoming national security special events.

that the disruption and wear and tear on personnel and their families would in many cases be expected to be substantially lower for HLS operations.[24]

Making Civil Support Capabilities Available Quickly

Recent efforts to enhance civil support capabilities that could be made available quickly on a short-term basis generally have sought to improve the capabilities of local first responders (e.g., through federally funded training and equipping programs, assistance in planning, and exercises). This focus has recognized that local first responders are likely to be more responsive than other (e.g., federal) capabilities, and that embracing an all-hazards philosophy by adding capabilities to existing civilian first responders (firefighters, hazardous materials [HAZMAT], emergency medical technicians) can result in a more efficient allocation of resources than would otherwise be the case. These efforts should continue if they will improve the responsiveness and capacity of the overall response and if doing so is cost-effective.

That said, there may be situations (e.g., when the costs of proliferating expensive technologies or other capabilities to the local level are prohibitive) that make it attractive to develop and field AC or RC capabilities whose responsiveness, capacity, and cost-effectiveness justify such action. Detection and assessment; decontamination; quickly deployable and specialized medical triage and evacuation (MEDEVAC/AEROVAC) capabilities;[25] and rapid, specialized transportation capabilities[26] are several examples we can cite for which capabilities might need to be made available quickly on a short-term basis.

Considering Major Factors in Developing AC/RC Policies for HLS

Five major factors should be considered in planning for the enhancement of RC capabilities for homeland security:

- *Whether a proposed capability fills an important gap in national capability.* For HLD, the proposed capability would have to fill an important *gap* in the military's overall ability to detect threats and provide an effective layered defense. DoD planning for HLD should be cognizant of the critical contributions made by civilian organizations in the early layers of the nation's layered defenses, and seek to build on and leverage off of these contributions. For civil support, a proposed capability would have to fill an important gap in civilian (local, state, and federal, including private-sector) capabilities. There will be little benefit in fielding capabilities in which the civil sector already is robust.
- *Whether it represents a significant capability that is needed to reduce the harm caused by an event.* For HLD, the proposed capability would have to improve the probability of detecting and preventing attackers from reaching their U.S. targets. For CS, it would

[24] Indeed, some activities, such as intelligence support and computer network operations, might rely upon "reachback" (obtaining products, services, applications, forces, etc., from organizations that are not forward deployed) capabilities, and be conducted from home installations.

[25] At present, it is not clear what mix of the following capabilities makes the most sense in WMD incidents: capabilities useful in evacuating those individuals who have been harmed by an incident and those capabilities that make possible the deployment on-scene of additional medical capacity. A variety of considerations (timeliness, footprint, etc.) would be expected to come into play.

[26] For example, C-130s that can quickly be configured for MEDEVAC/AEROVAC of burn victims following a nuclear event.

have to provide actual needed *capacity* for reducing the harm caused by an event, unless its contributions to the civilian response at the margin are likely to be modest.[27]

- *Whether it is responsive enough to make a difference.* The proposed capability would operate in timelines that are likely to be *responsive* enough to make a difference in outcomes. Both HLD and CS response timelines can be quite unforgiving, and capabilities that are needed quickly (either to thwart an attack or soon after an attack) but that are unlikely to be on-scene in time to make a difference are likely to be a waste of resources.[28]
- *Whether it compares favorably with other alternatives.* The proposed HLD/CS capability would have to compare favorably with other alternatives in effectiveness, cost, and cost-effectiveness. Questions to be raised are: Is it the most cost-effective means for addressing an identified gap, or are other (e.g., civilian) alternatives superior? Could other, existing capabilities (e.g., at the local level) be enhanced at the margin to provide comparable or greater improvements to effectiveness at equal or lower cost? To answer these questions requires understanding the likely capabilities, responsiveness, and cost of the full set of local, state, federal, civilian, military, public, and private capabilities.
- *Whether it is consistent with the Total Force perspective and emphasizes the comparative advantages of AC and RC forces.* If the comparisons for the first four factors suggest that a military capability is desirable, what are the comparative advantages (capacity, responsiveness, cost-effectiveness, opportunity cost) of placing that capability in the AC or RC? For example, since governors can call upon their state Guard (or request assistance from neighboring governors through mutual-assistance agreements), doing that may provide a more responsive capability than a federal capability that cannot be deployed until the governor requests, and the President approves, support from the federal government.

Development of Options

Given the above discussion of the issues, we now develop options to meet each of the five issues in turn.

Prioritizing HLS Mission Areas

The prioritization of the HLS mission areas should seek a balance between near-, mid-, and longer-term threats and needed capabilities. Rather than developing a set of options for a way of prioritizing mission areas, we instead identified four mission areas that we considered to

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[27] Command and control and other capabilities can be helpful; however, their significance may pale in comparison with capabilities that can actually mitigate harm in the wake of an event. In this regard, the ARNG WMD Civil Support Teams (CSTs) provide command and control, as well as agent-detection and -assessment capabilities, but they provide no actual capacity to mitigate harm (e.g., mass decontamination, medical). RDT&E that would lower the costs of detection and assessment capabilities so that they could be proliferated to first responders might be a better investment than the WMD CSTs.

[28] For example, it is not clear that the ARNG WMD CSTs will be responsive enough to be employable within the tight timelines that would make them useful in a chemical-weapon incident. Moreover, they may be irrelevant for biological incidents, because the most likely first responders in such cases would be health professionals who are diagnosing a victim who has become symptomatic.

be of highest priority, described how the demands in these areas might evolve and how policy responses might change as a better understanding is developed of where the leverage is to be found.

Apportioning Assets and Assigning Mission

As described above, the key question is: What forces will be permanently assigned to NORTHCOM and what forces will be assigned to force providers that may support NORTHCOM, especially Joint Forces Command? Because this question will be a major issue for NORTHCOM, and because the current environment is marked by fast-paced organizational and other changes, we did not develop specific options for apportionment and mission assignment.

Ensuring Homeland Security While Preserving Other Capabilities

The most recent QDR (2001) called for the military force to be sized for defending the homeland, carrying out forward deterrence, warfighting, and conducting smaller-scale contingency operations.[29] While giving highest priority to defending the homeland, the QDR also called for sufficient military capability to conduct a spectrum of operations, ranging from humanitarian and disaster relief up to and including major combat operations in various geographic settings. DoD is tasked to plan to provide a rotational base—a larger base of forces from which to provide forward-deployed forces—to support long-standing contingency commitments. Additionally, DoD is tasked to ensure sufficient numbers of specialized forces and capabilities to avoid overstressing elements of the force when they are involved in smaller-scale contingency operations. With respect to major combat operations, U.S. forces are tasked to remain capable of defeating attacks against U.S. allies and friends in any two theaters of operation in overlapping time frames.

As events at home and around the world demonstrate, this strategy will require continued reliance on both the Active and Reserve Components, to preserve capabilities across the spectrum of possible military operations. For example, on September 10, 2001, tens of thousands of U.S. active and reserve personnel were deployed around the world, engaged in operations such as NORTHERN WATCH, SOUTHERN WATCH, and the Balkans—smaller-scale contingencies.[30] The nondeployed active and reserve forces were focused on being prepared to respond to any other emerging threats to U.S. national interest, including major theater warfare. Yet, within minutes of the terrorism attacks on September 11th, aircraft were in the air; later, thousands of active and reserve forces were deployed throughout the country to protect air travel and critical infrastructure. These events reinforce the need for forces that can be tailored rapidly, deployed quickly, and employed immediately.

Even before the most-recent QDR and the events of September 11, each of the military services was taking actions to ensure that combat forces were ready, tailorable, deployable, and employable through various rotational constructs. Although labels for these constructs, force composition, and deployment or employment duration vary, the basic rotation scheme consists of periods for normal training/operations, specific deployment preparation,

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[29] Donald H. Rumsfeld, 2001, pp. 18–23.

[30] Lieutenant General Gregory Newbold, Senate Armed Services Testimony, March 21, 2002.

deployment/employment, and recovery. The normal training/operations period concentrates on honing unit mission skills and basic proficiency events. The deployment preparation period focuses on specific activities required during the projected deployment/employment. During the deployment/employment period, the units are deployed or are "on-call." Following the deployment/employment period, units enter a recovery period. Each of the services has at least one model that could be useful in addressing HLS crisis-response demands while preserving the capability to meet other, continuing mission requirements.

Naval carrier battle groups (CVBGs) and Marine Expeditionary Units/Amphibious Ready Groups (MEUs/ARGs) are scheduled to support 6-month rotations for forward presence and crisis response. Although both are employed in a variety of roles and, therefore, are formed and disestablished according to mission requirements, each has a standard organization.[31] Typically, each deploys for six months and, after returning from a deployment, enters an 18-month interdeployment training cycle, beginning with six months of personal leave and requisite equipment maintenance scheduled immediately after the deployment. Following this period, there is a 12-month training cycle that is broken into basic, intermediate, and advanced phases.[32] The MEU's training proceeds in a similar fashion, from basic to advanced, resulting in the certification of the MEU to conduct operational missions.

The Air Force has begun reorganizing itself into an Expeditionary Aerospace Force (EAF) that can deploy quickly from the continental United States to forward operating locations in response to a crisis, can commence operations immediately on arrival, and can sustain those operations as needed. The EAF allows the Air Force to better manage its force, providing its units and people both greater deployment stability and predictability and a means for determining when the force is stressed. Within the EAF, the Air Force has ten Aerospace Expeditionary Forces (AEFs) with predetermined sets of aircraft, equipment, and personnel from which tailored force packages deploy to support the warfighting combatant commanders; the AEF is the Air Force's preferred means of presenting forces to the warfighting combatant commanders. AEF elements fulfill a 3-month "on-call" period every 15 months. In addition to the 10 AEFs, as an interim solution to shortfalls in certain capabilities, specialized personnel fields, and types of equipment, the Air Force has organized two crisis-response Aerospace Expeditionary Wings (AEWs); AEW elements fulfill a 4-month "on-call" period every 15 months.

Finally, some Army divisions (e.g., airborne) employ a cycle system to maintain their readiness posture, conduct training, and support daily operations. A third of the division is in a mission-ready status, ready to respond to any contingency mission worldwide. Another third is in training-status, preparing to accomplish wartime missions. The remaining third is in support status, freeing the other two thirds to concentrate on mission preparedness and intensified training.

Homeland security will probably draw extensively on the capabilities of the Reserve and National Guard. Where appropriate, an HLS "rotational watch" construct, which would

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[31] A carrier battle group typically might have a carrier, two guided-missile cruisers, a guided-missile destroyer, a destroyer, a frigate, two attack submarines, and a combined ammunition, oiler, and supply ship; an MEU usually consists of a battalion-size Marine Air-Ground Task Force (MAGTF), which deploys aboard 3–4 amphibious ships.

[32] The basic phase lasts approximately six months and is the responsibility of the type commanders and the ship's commanding officer. The numbered fleet commanders have responsibility for training during the intermediate and advanced phases.

utilize assets from Active and Reserve Components, could help preserve capabilities to meet other continuing mission requirements, including preparation to conduct military operations up to and including major theater warfare.

Making Civil Support Capabilities Available Quickly

With the caveat that enhancing civilian capabilities may be the preferred option in many circumstances, there appear to be a reasonably wide range of potential concepts that OSD might explore for improving the responsiveness of RC capabilities for CS:[33]

1. increasing the readiness levels of existing CS assets (including needed mobility)
2. raising the frequency of participation in related non-WMD (e.g., HAZMAT) incidents
3. raising the frequency of no-notice WMD exercises
4. developing rotational readiness concepts (including part-time forces), in which one to a few units in neighboring states or Federal Emergency Management Agency regions, and their associated mobility, are postured to deploy and be on-scene in a minimal amount of time
5. prepositioning critical pieces of unit equipment (e.g., detection and assessment, decontamination) on (or near) RC airlifters, with units "marrying up" with equipment sets in an incident
6. increasing the number of units to ensure proximity of key capabilities in the event of an incident.

There also may be some possibilities for better integrating such voluntary quasi-private organizations as the Civil Air Patrol and Coast Guard Auxiliary into HLS planning and RC operations.[34] Again, these options should be evaluated on the basis of filling important gaps in overall response capabilities and of their responsiveness, capacity, and cost-effectiveness.[35]

Recommendations

The following subsections give brief recommendations for each issue to the Office of the Assistant Secretary of Defense for Reserve Affairs.

Prioritize HLS Mission Areas

We would recommend that the Office of the Assistant Secretary of Defense for Reserve Affairs (OASD[RA]) consider our choice of four mission areas for highest-priority focus while also seeking additional advice from within OSD, the Joint Staff, and the services that might suggest a different prioritization scheme would be more appropriate.

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[33] This list is illustrative only.

[34] The Civil Air Patrol assisted in the wake of 9/11 by providing surveillance capabilities; the Coast Guard Auxiliary has shifted its focus from boating safety to assisting in port and maritime security.

[35] An important constraint in planning will be to ensure that those whose civilian jobs already involve WMD-relevant areas (e.g., firefighters, HAZMAT, Emergency Medical Teams [EMTs], and other medical personnel) are not called up and taken away from these jobs, because they may make a greater contribution by remaining in civilian status.

Apportion and Assign Forces for HLS Mission Areas

We would simply recommend that OASD(RA) ensure that it is fully apprised of and engaged in future deliberations regarding the apportionment and mission assignment of forces for HLS, and that it seek to balance the risks of dual-tasking units to HLS *and* overseas missions with the costs of assigning forces exclusively to HLS missions.

Ensure Homeland Security While Preserving Other Capabilities

The Navy's machinery for scheduling deployments, the Air Force AEF construct, and the Army Airborne's approach for "rotational watch" would appear applicable for HLS Total Force management. Accordingly, we would recommend that OASD(RA) encourage the services to employ existing Total Force rotation and force-management constructs wherever possible. The appropriateness of a specific rotational approach depends, in large measure, on the inherent nature of the mission, on the predictability of mission requirements, and on the type and availability of required assets. The services' approaches for sustaining non-HLS missions would appear to extend to HLS, as well, and should provide a framework for ensuring that HLS demands are considered simultaneously with more-traditional ones:

- For example, the Navy's planning construct currently ensures the availability of needed forces for CVBG and ARG rotational deployments; it also could be used as a framework for simultaneously considering the scheduling of maritime assets for HLS missions and deconflicting these demands with forward-presence and crisis-response needs. However, the length of the deployment and interdeployment training cycles for HLS may need to be revisited, because the missions would presumably be more predictable.[36]
- The Air Force meets mission requirements by scheduling forces for steady-state contingency operations, such as Operation NORTHERN WATCH and Operation SOUTHERN WATCH, using the AEF rotation schedule. The AEF construct is most suitable when a steady-state demand exists for forces (e.g., performing a given number of alerts and flying a given number of combat air patrols). Since the Air Force uses the AEF construct as its means for presenting forces to unified commanders, it seems reasonable that the Air Force would want to include ongoing continental air defense requirements (as well as those for maritime, land defense, and other HLS missions) in the planning of AEF rotation schedules, thereby providing joint and Air Force planners more visibility into the total operational requirements.
- If the Army were to extend its "one-third, one-third, and one-third" approach to schedule forces for HLS as well as for OCONUS deployments, it might meet steady-state demands of both contingency operations abroad and HLS, and might preclude serious degradation of training for other missions.

In addition, the services should be asked to indicate the various ways in which they can minimize the risks that dual-tasking of units for both OCONUS and HLS missions will lead to competition for the same units by NORTHCOM and OCONUS warfighting combatant commanders.

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[36] It also may be possible to adapt training programs in ways that use training and exercises to support HLS missions. For example, maritime warning and defense tasks could be conducted during sea trials.

Make Civil Support Capabilities Available Quickly

OSD should commission studies and analyses to explore the merits of options similar to those presented earlier in this paper.

Consider Major Factors in Developing AC/RC Policies for HLS

In addition to the five factors that were offered for assessing policy options, we recommend that any policies that are developed also take into consideration, at minimum, the value-added of enhanced military capability and whether the enhancement capitalizes on the comparative advantages of AC and RC forces.

CHAPTER FOUR

RAND White Paper No. 3
Improving Fighter Pilot Manning and Absorption

William Taylor

Preface

Absorption *is the integration of new, inexperienced pilots into operational flying units while maintaining overall mandated experience levels. The number of fighter pilots in the Active Component falls short of meeting the Air Force's needs, and the operational units that train these pilots are unable to absorb the inflow of new pilots to a sufficient extent to address those needs. This paper, prepared in June 2002, provides insights into the Air Force fighter pilot absorption problem. It reviews possible solutions. As a think piece, the paper is not meant to be exhaustive; further, it includes references to more-comprehensive research that has been completed or is ongoing. Although written for the Office of the Assistant Secretary of Defense (Reserve Affairs), this paper is likely to be of interest to those concerned with fighter pilot inventories or active and reserve unit configurations.*

As discussed in this piece, the Air Force is currently suffering from an absorption crisis among its fighter pilots. To ease the crisis, the Air Force is examining several Future Total Force initiatives that may help ease the absorption constraints. One initiative would have selected units composed of both AC and RC personnel and resources with larger numbers of primary aircraft authorizations (PAAs) than current AC and RC fighter units. Absorption capacity would be greater in these units because the experience advantage among RC pilots could improve aging rates (the number of hours that inexperienced pilots can fly on average each month) and because increasing a squadron's PAA increases its training capacity without a corresponding increase in the number of staff or supervisory pilots it must support.

The author draws heavily upon ongoing research that is being briefed throughout the Air Force and will be published shortly.

Issue

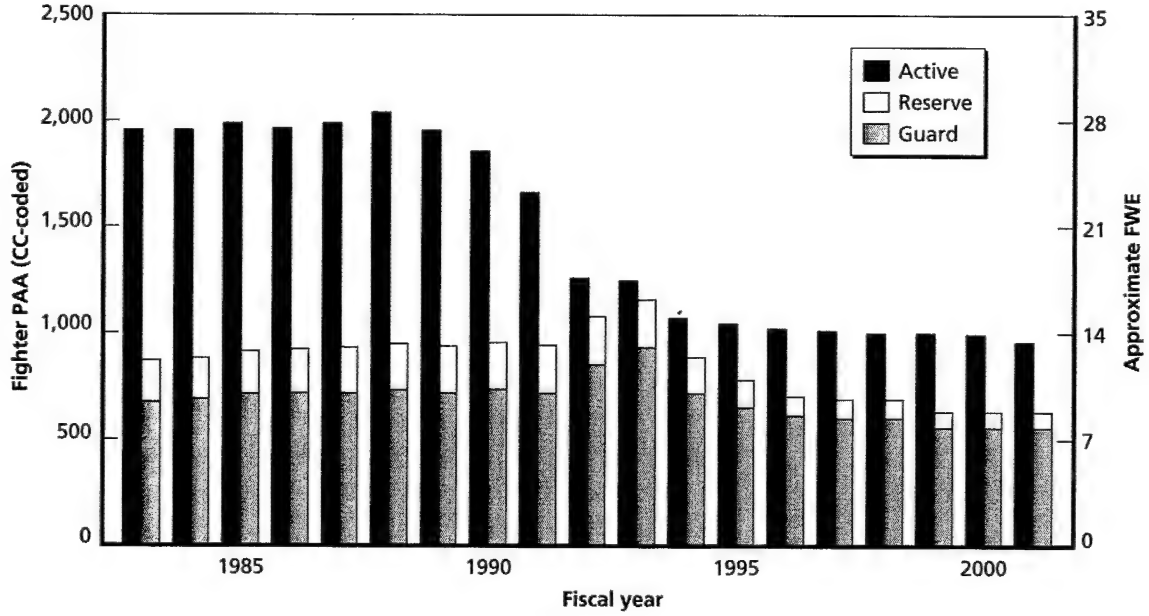
Can the Air Force use Reserve Component (RC) experience and force structure to ease its existing Active Component fighter pilot manning and absorption crisis?

Background

The Air Force is currently enduring unprecedented problems in managing fighter aircrews. There are too few experienced pilots in the Active Component (AC), yet so many new inexperienced pilots are entering the force that operational units cannot absorb them without jeopardizing readiness and safety. The ability of these units to absorb new pilots is a major concern, because all of the Air Force's other requirements (not in these units) demand experienced pilots with a thorough understanding of their operational mission. The force-structure reductions that occurred during the drawdown (see Figure 4.1) have reduced fighter primary aircraft authorizations (PAAs) to the point where the AC is unable to absorb enough pilots in its operational units to meet existing requirements, given pre-stop-loss[1] retention rates.

Because the Air Force must "grow its own" fighter pilots, the total inventory is determined by two factors: the *production rate,* or the number of new fighter pilots trained each year, and the *rate at which pilots are retained on active duty* following their initial active-duty service commitment (ADSC). Retention values are normally expressed in terms of the *bonus-take rate* (BTR), which measures the percentage of pilots who take the full bonus option and incur a long-term active service commitment at the end of their initial ADSC. The pre–September 11, 2001, BTR of 30 percent requires an annual production rate of

Figure 4.1
Active Fighter PAA Reductions Are Central to Current Absorption Problems



SOURCE: Data are from the Air Staff (AF/XPPE).
NOTE: All aircraft authorizations for operational units are combat coded (CC-coded). An approximation of the corresponding changes in fighter wing equivalents (FWE) is given by the right-hand axis.
RAND *TR140-4.1*

[1] Currently, some individuals cannot leave military service at their planned departure dates, which can confound retention rates.

382 fighter pilots to achieve a steady-state inventory equal to the existing AC requirement for 4,381 pilots. The current AC inventory is over 500 pilots short of this requirement, and the programmed production rate of 330 new fighter pilots per year will allow this shortfall to grow to over 600 pilots in steady state.

However, a previous RAND analysis indicates that the active fighter units can absorb a maximum of 302 pilots per year, based on available training capacity and computed aging rates for new pilots.[2] (The maximum absorption capacity of 302 pilots is calculated using the current Air Force objectives: an experience level of at least 50 percent and a manning level of 100 percent.) The *aging rate* is the number of hours that inexperienced pilots can fly, on average, each month. This parameter is influenced by unit *manning levels*—the primary mission, or Aircrew Position Indicator-1 (API-1) pilots assigned divided by the API-1 authorizations—and *experience levels*—the number of experienced API-1 pilots assigned divided by the total API-1 pilots assigned. Because a fixed number of sorties must be distributed among more pilots, aging rates decrease as manning levels increase above 100 percent, assuming fixed training capacities and average sortie durations (ASDs). In turn, aging rates decrease as experience levels decrease, because inexperienced pilots normally require in-flight supervision from experienced flight leads or instructor pilots (IPs), forcing experienced pilots to fly more, on average, as experience levels drop.[3]

Our analysis also indicated that continuing to absorb the entire 330-pilot production quota in active units will eventually result in levels of pilot flow to units that overwhelm the ability of these units to absorb them, creating unacceptable training conditions, with serious readiness and safety implications.

If no policy changes are implemented, the excessive flow of new pilots will drive manning levels above 125 percent and experience levels below 40 percent in operational active duty (AD) fighter units throughout the Combat Air Forces (CAF). These conditions will decrease the aging rates of inexperienced pilots and extend their time-to-experience (TTE) well beyond the time available. The training environment corresponding to these conditions must be regarded as unacceptable.[4]

These conditions mean that continuing current policies will create default conditions that:

1. Take operational AD fighter units into an unacceptable training environment that (a) fails to meet current Air Force goals to maintain a minimum experience level of 50 percent and a manning level of 100 percent and (b) generates negative implications for safety, as well as for readiness.

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[2] See William W. Taylor, James H. Bigelow, S. Craig Moore, Leslie Wickman, Brent Thomas, and Richard Marken, *Absorbing Air Force Fighter Pilots: Parameters, Problems, and Policy Options,* Santa Monica, Calif.: RAND Corporation, MR-1555-AF, 2002. This maximum is based on very optimistic assumptions regarding the ability of these units to absorb new pilots. Also, each unit's training capacity is determined by multiplying its *aircraft utilization rate* (expressed in sorties per airframe per month) by its PAA.

[3] The relationship between aging rates and experience levels is a primary finding in William W. Taylor, S. Craig Moore, and C. Robert Roll, Jr., *The Air Force Pilot Shortage: A Crisis for Operational Units?* Santa Monica, Calif.: RAND Corporation, MR-1204-AF, 2000. This analysis also established that units must maintain experience levels of at least 60 percent to ensure that available sortie resources can be spread uniformly between experienced and inexperienced pilots.

[4] Taylor, Bigelow, et al., 2002.

2. Ensure that the existing shortfall in fighter pilots never improves—and continues to worsen—unless the BTR can be raised significantly (above 50 percent).

Operational fighter units in the RC share several general characteristics with the AD fighter units that merit examining Total Force alternatives in search of more-acceptable conditions:

1. Most RC units have experience levels near 90 percent, because the majority of their pilots became experienced while on active duty.
2. Many RC units are experiencing problems maintaining 100-percent manning.[5]
3. Most RC units schedule their aircraft to fly at lower aircraft utilization (UTE) rates than do AC units.
4. RC fighter force-structure reductions were proportionally smaller than the AC reductions (see Figure 4.1).

Indeed, a 1999 Air Force decision reduced the production goal to 330 pilots (from 370), agreed that 30 AD pilots would be absorbed directly into RC units, leaving only 300 pilots to be absorbed into AC units. However, this Total Force Absorption Policy (TFAP) was never implemented in this original form, because the appropriate staff agencies in all components were not able to reach agreement on specific details. The contentious areas dealt primarily with funding difficulties and cultural issues. Many of the problems resulted from the failure in the early 1980s of an earlier effort, called Project Season, to absorb AC pilots into RC units. More-effective implementation policies could have prevented many of the complications associated with Project Season, but several concerns still remain valid and need to be resolved before any Total Force policy options become final.

A major problem with Project Season resulted from the shorter ADSC (five or six years, depending upon Undergraduate Pilot Training [UPT] entry) then in effect. When coupled with a liberal Palace Chase program, which released AD pilots early, provided they agreed to serve in an RC unit for a period comparable to their original ADSC, participating AC pilots could separate from active duty and affiliate with the RC unit following their initial assignment. This policy meant that the RC units could recruit the desirable AD pilots and persuade them to affiliate. The units were clearly most aggressive in recruiting the better pilots, who exhibited a firm understanding of the unit's primary mission. These recruiting efforts were quite successful, resulting in high separation rates among the Project Season participants. Conversely, participating AC pilots who did not perform well in their initial operational assignment were the least likely to be recruited by their RC unit leaders and, thus, more likely to remain on active duty following a Project Season assignment.

That a disproportionate share of participating AC pilots failed to distinguish themselves during their assignment in the RC unit could have contributed to a negative perform-

[5] Manning problems in RC units are likely to get worse, because, starting in fiscal year (FY) 2002, the Undergraduate Pilot Training (UPT) cohorts reaching the end of their initial ADSC will be small drawdown cohorts, which include very limited numbers of fighter pilots. Pilots at the end of their initial ADSC typically represent the primary recruiting source for operational RC units. Moreover, as the drawdown cohorts start to clear the system, the transition from an 8-year ADSC to a 10-year ADSC will limit the number of pilots eligible to separate from active duty during FY2008 and FY2009.

ance bias. Also, because the RC units were required to accept the additional AD pilots without receiving any additional training resources, the participating AD pilots flew at lower RC sortie rates, whereas their contemporaries in traditional AD units flew at higher AD rates. The Project Season participants thus often arrived at follow-on flying tours with considerably fewer flying hours than did their AD contemporaries. These factors illustrate how their performance could be viewed as inferior to that of their contemporaries who flew with AD units.[6]

Development and Discussion of Options

The Air Force has an absolute need to develop a set of policy options that will enable it to absorb enough new AC fighter pilots each year so that it may build its inventory to match requirements while maintaining an acceptable training environment in its operational units. These units cannot function indefinitely in conditions that are worse than a manning level of 100 percent and an experience level of 50 percent—values that are essential for readiness and safety in the operational fighter units and that cannot be compromised. Indeed, a 50-percent experience level should be viewed as a minimum acceptable level, and conditions should be established that enable experience levels to grow gradually toward the 60-percent value, which enables inexperienced pilots to fly roughly the same number of sorties on average as the experienced ones.

The magnitude of the absorption problem is illustrated by the fact that the required increase in training capacity corresponds to an AC fighter force-structure increase of four fighter wing equivalents (nearly a 33-percent increase) to absorb the 382-pilot production rate needed (with optimistic assumptions regarding unit training capacities). Conversely, reducing the flow of new pilots to the current absorption capacity of 302 pilots per year would require a BTR of 70 percent (more than double the pre-stop-loss retention measures), or a requirements' reduction of 1,000 pilots (a 23-percent reduction) to match inventories with requirements. Ongoing Air Force initiatives that require existing UTE and flying-hour programs to be fully funded and flown, strive for improved retention, and examine alternative manning options to reduce requirements may be critical in preventing problem exacerbation, but it is unlikely that these options alone can offer any permanent resolution. Indeed, it becomes clear that the only initiatives that can permanently resolve Air Force fighter pilot absorption issues are those that address the AC force-structure reductions depicted in Figure 4.1.[7]

This conclusion was recognized when the original TFAP program was proposed in 1999. Indeed, the original version improves absorption by the same amount as an AC force-structure increase of 1.5 FWE, thus generating an *effective* increase in force structure with its 30-pilot flow reduction to AC units. Unfortunately, the version of TFAP that was eventually accepted is not nearly as effective in addressing absorption issues. That is, the new version is a limited-experience (LIMEX) option, inasmuch as it requires that all active-duty pilots start their operational flying in AC units. Pilots who volunteer to do so can then move on to RC units one or two years later to fly similar aircraft and continue their aging process. Additional

[6] These issues are also discussed in Taylor, Moore, et al. (2000).

[7] See Chapter Six of Taylor, Bigelow, et al. (2002) for more details.

constraints will limit participation to roughly 20 AC pilots per year, and the corresponding flow reduction to AC units (calculated in terms of the number of man-years spent by inexperienced pilots in AC units) will be only five pilots per year. These values are far less than the absorption capacity of a single AC squadron. The ineffectiveness of the LIMEX initiative is confirmed by observing that, even with LIMEX fully implemented, a sustained production rate of 330 pilots per year will still drive operational AC fighter units to manning levels over 120 percent and experience levels below 40 percent—conditions that will definitely destroy their training environments while reducing aging rates and extending TTEs.

These requirements mean that alternatives must be examined for increasing training capacity and simultaneously reducing the flow of newly trained pilots into operational units.

The Air Force is currently examining several Future Total Force (FTF) initiatives that would evaluate unit constructs that may prove much more effective in easing absorption constraints. These units would contain both AC personnel and RC personnel and/or resources, and they would have larger PAAs than current AC and RC fighter units. Absorption capacity would be greater in these units because (1) the experience advantage among RC pilots could improve aging rates and (2) increasing a squadron's PAA increases its training capacity without a corresponding increase in the number of staff or supervisory (API-6) pilots that it must support. These conditions would mean that all of the additional sorties represented by the PAA increase could be devoted to training for API-1 pilots.[8]

Such unit constructs do not currently exist in the fighter community; they could only be incorporated in a long-term approach to ease absorption difficulties. Additional analysis may be required to determine what kinds of unit combinations can provide the best combinations of absorption efficiency and mission effectiveness for the CAF. Finding a feasible long-range alternative would enable decisionmakers to focus on transitional methods that can test possible long-term resolution options more efficiently and effectively.

Toward this end, Air Combat Command (ACC) and Air Force Reserve Command (AFRC) staff elements are examining several transitional alternatives that could contribute directly to both the absorption problem and the FTF transition process. These alternatives are built upon the successful implementation of the Fighter Reserve Associate Program at Shaw Air Force Base, South Carolina, and they involve shifting AC personnel into RC units, as well as placing RC personnel in AC units. When they are used in combination, these alternatives appear to be most effective at addressing absorption problems.

One combination that we have tested in our absorption models would place one Active Guard and Reserve (AGR) IP and three traditional reservist IPs in an AC squadron in exchange for two experienced AC pilots. The two AC pilots (one O-5 IP and one O-4 flight lead, for example) could then join an RC unit to provide direct supervision and counsel to inexperienced AC pilots who would join the RC unit as "nuggets" directly from their formal fighter basic course (B-Course) training. Our notional example assumes that there would be no more than five of these nuggets in the RC unit at any point in time. This assumption equates to a flow of one or two pilots per year (for an average of 1.5) that could be absorbed in the RC unit using traditional 3-year assignments. Additionally, the added IP presence in

[8] These conditions also ensure that aging rates increase, because inexperienced pilots should be assigned only to API-1 billets. API-6 billets need to be filled by experienced pilots. Higher-PAA squadrons also improve absorption capacity in strictly AC units. A wing with three 24-PAA squadrons, for example, has essentially the same API-6 requirements as does a wing with three 18-PAA squadrons. The former unit can therefore devote its entire 18-PAA advantage to API-1 training.

the AC unit would increase its absorption capacity by 0.5 pilot per year, yielding a net absorption increase for the AC/RC unit combination of two pilots per year. Approximately 30 operational RC fighter squadrons are currently available, so the potential increase in absorption capacity would be roughly 60 pilots, if each pilot could be paired with an AC squadron.

Concerns have been raised on both sides regarding the time and effort required to develop the nuggets into experienced officers, as well as pilots, during the first Air Force assignment in which they are no longer students in a formal training program. The experienced AC pilots would address these concerns, as well as running the extensive mission qualification training program required for the nuggets. Upon completing a nominal 3-year tour, the absorbed pilots, who are no longer nuggets, would be experienced and eligible for reassignment wherever they might be required. Their 10-year ADSC should eliminate the Project Season problem caused when they separated to remain in the RC unit.

The AC presence of up to seven pilots would clearly improve the RC unit's ability to meet its AEF tasking and any other contingency obligations. Additionally, their presence would help to counter the RC manning problems that can be expected to continue at least until FY2010. Moreover, the RC unit experience levels would still remain well above those of comparable AC units, and crew ratios would be greater for combat operations. A final advantage could be improved Total Force integration for the RC, especially during the fighter aircraft conversions to F-22s and Joint Strike Fighters that will occur during the next 15 years.

The direct costs involve the requirement for the unit to generate 30 to 40 additional sorties to ensure that the AC pilots could meet their monthly Ready Aircrew Program training requirements. The existing Fighter Reserve Associate Program includes an RC maintenance presence, as well as RC pilots, and ACC and AFRC staff agencies are currently examining the factors associated with an AC maintenance presence in the RC units as well. Indirect costs must still be identified, and the notional example presented can certainly be modified should doing so prove beneficial.

The primary AC advantage is the potential resolution of its absorption crisis in the near-term while Total Force alternatives can be examined and tested for long-term resolution. Additionally, the participating AC squadrons have a greater IP presence, plus a marked increase in corporate memory within those units. Observers at Shaw AFB have indicated that the increased corporate memory tends to compensate for the reduced flexibility in scheduling the traditional reservist IPs—especially during periods when the unit must conduct split operations and continue extensive mission qualification training programs at the home station. Indeed, the current ACC and AFRC efforts resulted from the previous ACC Commander's tasking to examine options for expanding the program at Shaw AFB.

Recommendation

The Office of the Secretary of Defense should encourage and support the current ACC and AFRC transitional alternatives that developed from their efforts to expand fighter associate programs. These efforts should be coordinated with ongoing FTF initiatives to develop the unit constructs that can overcome the AC force-structure limitations and provide a long-term resolution for its manning and absorption problems. The transitional alternatives can

help to achieve this end. The Air National Guard, which owns most of the operational RC fighter units, must also be brought quickly into this planning process.

The program costs of these alternatives must be fully identified and examined. These costs must then be compared with the costs associated with policy alternatives that can resolve the absorption and manning problems. A 4-FWE increase in AC force structure is certainly prohibitive, so this examination must also be contrasted with the problems that will arise if no action is taken and the AC units continue on their current course toward low aging rates and excessive TTEs for new pilots.

If the long-term solution is going to include allowing fighter pilots to move to follow-on assignments with significantly less experience and training than have been the historical norm, this decision must be deliberate, and it should be based on a thorough understanding of all of the implications of such an action. The resulting conditions should not be allowed to happen by default.

CHAPTER FIVE

RAND White Paper No. 4 Potential RC Contributions to Smaller-Scale Contingencies

Ron Sortor

Preface

Since the mid-1990s, RC units have been participating extensively in smaller-scale contingencies (SSCs). This paper, prepared in June 2002, reviews six studies done in the mid-1990s and concludes that the key considerations in the use of RCs in SSCs fall into one of three major categories: the timely availability of the required skills and capability, the short-term costs and benefits of using RC rather than AC elements, and the potential long-term costs and benefits. Only one of the six studies examined more than one or two of these considerations, and none addressed the long-term effects on recruiting, retention, or readiness.

The paper discusses several options for future use of RC personnel in SSCs, either directly or indirectly, to mitigate the effects of SSC participation by AC units: the increased integration of part-time reservists into AC units, either as individuals or as organized elements. The paper recommends that (1) longitudinal data be collected on RC participation in SSCs, (2) analysis be started to explore and evaluate alternative policy options, and (3) a more broad-based review be conducted on the intensive participation of RCs in SSCs and the long-term consequences.

Issue

Since the mid-1990s, Air Force and Army RC units have been participating extensively in ongoing SSCs. This level of involvement differs from the historical role played by RCs in SSC-type operations. In the past (with the exception of Operation DESERT STORM), rarely more than a few hundred RC personnel were on active duty at any one time in support of operations. Recently, more than 83,000 RC personnel were on active duty from the seven Reserve Components. There is no longer any question, if there ever was one, of whether RCs can or will participate. The question is, What are the circumstances that make more or less sense and what are the factors that need to be considered when deciding whether or not to use RCs in a particular SSC?

Background

RC units and individuals have participated in SSC-like operations. In most of these instances, the participation has been by relatively small units in volunteer status, for short

duration, to meet short-term needs, and in augmentation of larger AC elements. In many operations involving the RC, the participation was during an extended annual training period. However, since the beginning of Operations SOUTHERN WATCH and JOINT ENDEAVOR in the mid-1990s, the Air Force and Army RCs in particular have been called upon to provide larger forces using Presidential Selected Reserve Call-up (PSRC), for months at a time, to meet ongoing operational needs. In some operations, the RC elements were the larger fraction of the deployed force. Further, these needs have been met by repeated RC deployments. The RCs have deployed force elements ranging from individuals to division headquarters, in the case of the ARNG. In all cases, the operations have been successful. The missions have been accomplished, and few problems have been reported.

What can the past tell us about the future? What are the pros and cons of continuing or even increasing the degree of RC participation? Most publicity about past operations has tended to be based on one of two conclusions. First, the operation was an outstanding success, demonstrating the need for and readiness of the RC for any and all occasions for which they might be called. Second, the call-up has been mismanaged, the RC used for purposes for which they were not intended, and recruiting and retention problems are about to reach crisis proportions. Neither conclusion is completely true nor, perhaps, completely false. Still, neither conclusion provides sufficient basis for policymaking with regard to future participation of the RCs in SSCs. Unfortunately, very few systematic empirical analyses have been done on deployments since the mid-1990s that would provide a better basis for policymaking.

Although extensive research has not been done on the more recent RC participation in the Balkans and in Multinational Force and Observers (MFO)-Sinai, research from the mid-1990s did attempt to explore some of the issues relevant to RC participation in SSCs. In May 1995, the Institute for Defense Analysis (IDA) published three case studies exploring the use of RC units for MFO-Sinai, Operation RESTORE HOPE, and in Operation MAINTAIN DEMOCRACY.[1] One of the broader studies aimed at RC participation was a RAND study that sought to identify the impediments to the use of RCs in SSC-like operations.[2] One of the most extensive studies was conducted by the U.S. Army Research Institute (ARI) on the 28th MFO-Sinai rotation in 1995.[3] That rotation consisted of 80 percent RC and 20 percent AC. In 1997, RAND published a report on the effect of operations other than war (OOTW) participation on the availability of Army forces for an MTW.[4] That study included a section on the use of RC forces. The results of these studies are summarized below.

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[1] John R. Brinkerhoff, *Case Studies in Reserve Component Volunteerism: The 670th Military Police Company in Operations UPHOLD DEMOCRACY,* Alexandria, Va.: Institute for Defense Analyses (IDA), IDA Document D-1663, May 1995a; John R. Brinkerhoff, *Case Studies in Reserve Component Volunteerism: A Composite Battalion Task Force for the U.S. Army Element of the Multinational Force and Observers Mission, Sinai,* Alexandria, Va.: Institute for Defense Analyses, May 1995b; and John R. Brinkerhoff, *Case Studies in Reserve Component Volunteerism: The 258th Quartermaster Supply Company,* Alexandria, Va.: IDA Document D-1668, May 1995c.

[2] Roger Allen Brown, John F. Schank, Carl Dahlman, and Leslie Lewis, *Assessing the Potential for Using Reserves in Operations Other Than War,* Santa Monica, Calif.: RAND Corporation, MR-796-OSD, 1997.

[3] Ruth H. Phelps and Beatrice J. Farr, *Reserve Component Soldiers As Peacekeepers,* Washington, D.C.: U.S. Army Research Institute for Behavioral Sciences (ARI), September 1996.

[4] Ronald E. Sortor, *Army Forces for Operations Other Than War,* Santa Monica, Calif.: RAND Corporation, MR-852-A, 1997.

The 1996 RAND study by Brown et al. sought to identify the impediments to the use of reserves and to recommend actions to alleviate, if not eliminate, those impediments. The study formulated a framework for analyzing the factors influencing the use of Reserve Component versus Active Component forces. Of the eight influences identified as commonly shaping the demand for forces,[5] three were felt to generally work against the use of the Reserve Component: urgency, duration, and level of threat. The other five could work either way. Two major influences—institutional (DoD and service policies) and resource (process for funding contingency missions) were identified as affecting the forces supplied because they affect the criteria used in identifying and selecting forces: availability, functional requirements, responsiveness, level of risk, perceived importance and national acceptance, and accessibility. Only the final criterion, accessibility (authority to access units or individuals of the RC) is unique to the Reserve Components.

The three case studies conducted by IDA examined three very different operations with respect to the reliance on RC volunteers. For MFO-Sinai, volunteer reservists were sought for an active-duty tour as part of a composite unit manned with a mix of Active and Reserve Component personnel and formed expressly for the one operation. For RESTORE HOPE in Somalia, volunteers were solicited for duty in a reserve postal unit. For MAINTAIN DEMOCRACY in Haiti, Reserve Component units were involuntarily called to active duty using PSRC authority. However, units to be called were selected partly on the basis of being able to get sufficient "volunteers" from the unit, because DoD guidance was to rely on the use of volunteers to the maximum extent possible. In all three instances, the mission was accomplished, but both the AC and the RC expressed problems and dissatisfaction.

Obtaining sufficient qualified volunteers from various individual units so that they could be called up as a new, composite unit has not been successful in many cases. The postal unit deployed to Somalia in 1992 was not able to obtain 49 volunteers from a single unit and had to draw from a number of units. The ARNG had a similar experience when it tried to rely on volunteers from a single division for the MFO-Sinai rotation in 1994. This difficulty also emerged with Military Police (MP) companies called in support of Operation MAINTAIN DEMOCRACY.[6] Just as with AC units, drawing volunteers from a number of units to form a deploying unit potentially affects not only the effectiveness of the deploying unit but also the readiness of the units from which the volunteers were obtained. The concern with the use of composite units, particularly if formed from the RC, was not unique to the U.S. Army.[7]

The 28th MFO-Sinai rotation was the subject of two of the studies cited above (Brinkerhoff, 1995b; Phelps and Far, 1996), with the most extensive study done by ARI. As a result of a suggestion by the Chief of Staff of the Army, the 6-month rotation, from January 1995 through June 1995, was conducted with a unit that consisted of 20 percent Active Component soldiers, 70 percent soldiers from the ARNG, and 10 percent soldiers

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[5] The eight influences are task-resource requirements; scope of the operation; urgency; duration of operations; level of threat; level of control; treaty, policy, or mandate restrictions; and involvement with nonmilitary organizations.

[6] See Brinkerhoff (1995a, b, c) for a more complete description of the use of volunteers for these missions.

[7] See Franklin C. Pinch, *Lessons from Canadian Peacekeeping Experiences: A Human Resource Perspective,* Washington, D.C.: Army Research Institute for Behavioral Sciences, August 1994. He found in a study of Canadian participation in peacekeeping operations that "Formed units have been preferred over ad hoc units because of the former's superior cohesiveness. Regular force units have been favored over reserve units, for reasons of personnel availability, predictability and the purported value of in-depth military experience in performance. . . ." (p. 1194).

from the U.S. Army Reserve (USAR). This composite unit was formed and trained explicitly for this one rotation and disestablished after the rotation was completed, with the Reserve Component personnel returned to reserve status. All of the Reserve Component personnel were volunteers serving under orders to extended active duty. The ARI study offered conclusions in five areas:

1. *Personnel:* Sufficient qualified RC soldiers volunteered.
2. *Training Procedures and Tasks:* Soldiers were well trained and conducted a successful mission.
3. *Attitudes and Perceptions:* Cohesion was high, but morale declined.
4. *Family Support System:* Combined AC/RC system was successful.
5. *Impact on RC Home Unit:* Unit morale increased; unit can compensate for small temporary losses in personnel.

The report also offered recommendations in each of these areas.[8] To the best of our knowledge, there was no long-term follow-up on the personnel, and no similar analysis has been done on subsequent rotations or other RC deployments on SSC missions.

Based upon these studies and other unpublished work, the key considerations in the use of RCs in SSCs appear to fall into one of three major categories: skills, short-term costs and benefits, and long-term costs and benefits.

First, we need to ask, Are the skills and capabilities in the RC and can they be made available in a timely manner? In some cases, the particular skill may be available only from the RC. In some cases, such as Civil Affairs and Psychological Operations in the Army, the RC has vastly more capability than the AC. However, for most capabilities, the main issue is the time needed to call the unit and prepare it for deployment. Time is of more concern when the unit is being involuntarily called on short notice to extended active duty rather than voluntary participation. Time is not usually a problem when an extended planning period is involved and/or the personnel are to serve a short, voluntary tour or to be in training status. The possible short- and long-term consequences of the extended involuntary service are also often much less clear-cut.

Second, we need to ask, What are the short-term costs and benefits of using RC elements rather than AC elements? Short-term costs include the direct dollar costs, the effect of reduced unit readiness (both during and after the deployment), the effect on retention and recruiting, and (although only rarely a prime consideration in the past) the effect of not being available for near-term MTW capability. A possible benefit would be better-trained and more-cohesive units.

Third, we need to ask, What are the potential long-term costs and benefits? The long-term consequences (costs) that are of concern for the RC usually involve future resource-allocation decisions, unit readiness, retention and recruitment, and employer support.

Only the ARI study treated more than one or two of these considerations. None of the reports looked at the long-term effects on recruiting, retention, readiness, etc. Further, most of the circumstances of and expectations for RC participation have changed substan-

[8] For the detailed analysis, see the ARI report by Phelps and Farr (1996).

tially since these studies were done. The studies suggest options and concerns for the future use of RCs in SSCs, but they do not provide any definitive basis for policymaking. Some of the options for further consideration and study are discussed in the next section.

Development and Discussion of Options

Most of the options for the direct use of RCs in SSCs have already been attempted. RC personnel have been used to fill requirements for both small- and large-scale operations. They have served in theaters both in CONUS and overseas, as volunteers and nonvolunteers in various combinations of participation and pay status. For many years, individuals and small units have participated in operations as a by-product of training, filling aircrew, medical, and engineering construction needs all over the world. More recently, RC combat elements have participated in extended operations, using both short and long tours and rotation patterns. Major Army RC headquarters have deployed, along with both AC and RC subordinate combat elements. Numerous other combinations have been tried; some, presumably, have been more successful than others. What has not occurred has been the follow-up, data collection, and analysis required to evaluate systematically the resulting costs and benefits and to provide the empirical basis for policymaking for future SSCs.

The direct participation of RCs in SSCs has drawn the most attention in the past few years; however, the RC role as a reserve for a large MTW or general war is still the heart of the mission for many of their members and supporters. With some change in structure and planning, this role could be enhanced and, at the same time, help in a less direct way in mitigating the effect of SSCs on Total Force capability. For example, most active Army support-type units are manned at less than their wartime requirement, which results in cross-leveling[9] of personnel among AC units deploying to SSCs in order to bring those units to full strength. At the same time, it leaves units at home station that are not ready to deploy at full strength in the event of an MTW. One option would be to add sufficient Active Component personnel to these units in order to bring them to their required deployment strength.

Adding permanent part-time individual Reserve Component personnel to compensate for the structure shortfall of the active unit is a much less costly option. It would provide a means of bringing the unit to full strength for an MTW with personnel who had trained with the AC unit and who were familiar with the unit's procedures and personnel. Further, it would provide a pool of personnel to fill in at home station in peacetime for active personnel deployed to an SSC and a source of potential RC volunteers for deployment to the SSC with the active unit. This option would function similarly to the programs in all of the services in which Individual Mobilization Augmentees are assigned to active elements.

For some types of units, it may be better to form sub-organizations (similar to Air Force Associate units) that would be manned by reservists to train with the active unit on a continuous basis. (Adding RC personnel organized in firing batteries to existing AC Patriot units to man pooled equipment is one possible example.) If a section or element from the active unit were to deploy to an SSC, the reserve elements could be called and immediately available to deploy to an MTW, along with the active elements and equipment remaining at

[9] *Cross-leveling* is the moving of soldiers from one unit to another to ensure that each unit has enough qualified soldiers for the required jobs.

home station. A complete unit would then be ready to accomplish its wartime mission, even though some elements of the unit might still be engaged in the SSC. Alternatively, the reserve personnel could be used to deploy to the SSC while the AC personnel are permitted a respite from deployment and an opportunity to train for their wartime tasks.

Although these force-structure alternatives have applicability for some units, the most critical and widely applicable SSC role for the reserves remains their role in augmenting the active component for an MTW or general war. It is here that an enhanced reliance on the reserve units may have the greatest potential for mitigating the effects of an SSC on the AC capability to deploy to an MTW while engaged in one or more SSCs. This role would be of value even when the reserves cannot be used in direct support of the SSC engagement. For example, when an active unit is identified for deployment to an SSC, especially a specialized unit that is in short supply in the Active Component, it should be recognized that a "hole" would likely exist in Time-Phased Force and Deployment Data or in a contingency plan. Like-type RC units could then be identified, brought to a higher degree of readiness, and prepared for possible early deployment to an MTW, should one occur.

These latter options, along with others, may better provide for RC participation in SSCs and the mitigation of the effects of SSCs on Total Force capability in a way that is more compatible with the constraints on the citizen soldier. Some RC personnel may find it fairly easy to participate for an extended period of time in deployments to SSCs; others may not. Analysis needs to be done to identify more effectively to what extent the increased participation in recent years has stressed the ability of the RC members to combine their roles as civilians and part-time military. Failing to do so may result in unexpected recruiting, retention, or readiness effects that would be difficult and costly to overcome. In addition to averting these possible unexpected consequences, the indirect-role options would also be less costly in terms of the incremental pay and training cost involved when the RC is used in a direct role in SSCs.

Recommendations

The following are recommendations for what is needed for forming policy on the participation of the Reserve Component in small-scale contingencies:

- Begin collecting longitudinal data on individuals and units that have participated or are participating in SSCs. These data would support analysis of the retention, recruiting, and readiness effects of SSC deployments. Surveys of RC members could provide additional information and an early warning of possible problems before those problems become critical.
- Begin a series of analyses to explore in greater depth than in this paper or earlier reports, alternative policy options that might be considered for RC participation in the future and the key considerations that should be addressed during the decision-making process.
- Begin a broad-based review of the intensive participation of RCs in SSCs and the potential long-term force structure and readiness consequences for both SSC and MTW capability.

APPENDIX A

Selected Past RAND NDRI Research on Reserve Components

To inform their review of possible Reserve Component roles in the nation's defense, the Office of the Assistant Secretary of Defense for Reserve Affairs (OASD[RA]) asked for overviews of relevant past RAND research. Each of RAND's federally funded research and development centers (FFRDCs)—the National Defense Research Institute (NDRI), the Arroyo Center (the Army's FFRDC; see Appendix B), and Project AIR FORCE (see Appendix C)—chose and summarized recent studies that could be helpful to the Office of the Secretary of Defense (OSD) working groups conducting the RC review.[1] This appendix contains the NDRI overview, originally presented in the form of a briefing.

NDRI was asked to select several studies that were perceived to be germane to the present review and to summarize them in terms of review issues. We focused on three studies conducted from 1992 through 1997:

- *Assessing the Structure and Mix of Future Active and Reserve Forces: Final Report to the Secretary of Defense* (MR-140-1-OSD)
- *Assessing the State and Federal Missions of the National Guard* (MR-557-OSD)
- *Assessing the Potential for Using Reserves in Operations Other Than War* (MR-796-OSD).

We found the questions that drove these studies generally remain pertinent, even if today's different missions, strategies, or political context may produce quite different answers.

For our briefing to our sponsors, we considered each original research question in light of the issues that were under consideration in the RC review: priority missions, AC/RC force mix, organization and resources, or combinations of each.

Assessing the Structure and Mix of Future Active and Reserve Forces: Final Report to the Secretary of Defense

First, let us consider *Assessing the Structure and Mix of Future Active and Reserve Forces: Final Report to the Secretary of Defense* (1992). This study provides a service-by-service view of the force mix, including comparisons of alternative force mixes, and addresses the purpose of reserves. Relevant to our four issue areas are the following findings:

[1] Abstracts of many of these documents are included in Appendix D.

Priority Missions

The study stresses that AC/RC mix decisions should reflect the central and long-standing mission of augmenting active forces in conflict. Still, if alternative purposes come to the forefront (e.g., peacetime support of the nation), new strategies may necessitate significant changes in the AC/RC mix, RC missions, organization, integration with the Active Component, and resourcing levels. All of these factors are strategic in that they should be directly linked to the specific mission's purpose and environment.

AC/RC Force Mix

Two criteria emerged in the study as important for making AC/RC mix decisions. First, although it does not explicitly govern the role of reserve forces, cost-effectiveness has been the dominant criterion for 30 years and is generally achieved by relying on reserve forces as the primary augmentation to active forces. Reserve forces are less costly to maintain and, given sufficient time to mobilize and deploy, can be brought to an effectiveness equal to that of active forces.

Second, requiring reserve participation in both support and combat roles during mobilization has emerged recently as an important criterion for the AC/RC mix. This objective has a direct effect on RC decisions and leads to tighter integration of forces. It also has benefits and liabilities. Use of reserve forces minimizes the likelihood of isolation from the public, because the nation goes to war, not just the military.

For AC/RC mix, it is also important to note that, at the time the research of *Assessing the Structure and Mix of Future Active and Reserve Forces* was undertaken, the national military strategy held four requirements: strategic deterrence and defense; forward presence; crisis response; and reconstitution or expansion potential.

The requirement that most affected the AC/RC mix was *crisis response.* The key element was *the time it takes to respond,* a variable affected by many factors, including the size and robustness of the AC; the amount of support structure in the RC; deployment; need; the amount of post-mobilization preparation; peacetime status and resources; and lift—all of which we discuss briefly here, because the findings remain relevant.

In peacetime, reserve combat units could be held to higher or even lower standards for preparedness, depending on resource decisions. These standards might make them more or far less comparable to active units. AC combat units have usually been provided sufficient people, equipment, and training opportunities to maintain a C-1 or high C-2 level of readiness in peacetime, which means the ability to do their "full" wartime mission with little or no post-mobilization train-up. This "ability" might decay if the provision of inputs lessens. If it does decay, depending on the deployment standard determined for a contingency, active units themselves might be unable to meet the standard without additional post-mobilization training. Also, depending on the reserve peacetime status, reserve units might need less time to meet a standard that is different from C-1. These considerations remain relevant with regard to the effect on the time to respond.

The readiness standard for deployment depends on the actual wartime need for units, which depends on the overall robustness of forces available. If the deployment standard for future conflicts is C-1, and active units are below that standard in peace, then active units will need a post-mobilization train-up period. Alternatively, if the deployment standard for a future contingency is less than C-1 (as it was for Air Force and U.S. Marine Corps combat units in Operation DESERT SHIELD/STORM), then reserve combat units would need less

time to train to the standard. As the General Accounting Office and others have pointed out, objective criteria for determining when standards were met would be useful for both active and reserve units.

Lift—both sea and air—is a key factor for both active and reserve deployment. Substitutes to lift are available—for example, forward stationing of forces in regions where they may be used—but may have certain constraints. This option is expensive, fewer nations seem desirous of having U.S. forces present in their territory, and it presumes some foresight as to where forces will actually be needed. A second option is prepositioning of equipment, usually on ships. If lift is not available, "time to prepare" becomes less relevant, and the Reserve Component overall becomes more relevant because forces cannot be deployed quickly. Lift becomes the bottleneck, rather than time to prepare.

Reform for units that met their deployment dates in Operation DESERT SHIELD/STORM may be moot, except under changed assumptions in the future, such as the need to deploy sooner or at higher standards or given less robust overall active and reserve forces.

Do reserve units get called because they are part of the Total Force or only as capability is needed? This study advocated continued evolution toward tighter integration of active and reserve forces based on symmetry of purpose. What is the nature of a different evolution for Total Force? One possibility is toward greater separation by role, mission, and function rather than integration across all three. In this interpretation, it is conceivable that active combat forces could be focused on forward presence and on early deployment for contingencies; reserve support forces could be focused on husbanding diverse capability needed in a variety of peacetime and wartime uses; and reserve combat forces could be focused on domestic uses while providing a traditional combat "reserve" for the nation.

Organization

The study authors delineate a series of organizational choices with regard to the active and reserve forces, ranging from fully formed units (in AC and/or RC) to various forms of expansibility, including:

- Use of "roundout," which means providing a missing unit for a formation.
- Use of "roundup," which means units deploy later and provide added capability.
- Mixing active and reserve units within reserve-commanded units, such as support commands.
- Use of "associate units," hybrid units that combine active and reserve personnel into a single unit on mobilization. In peace, the RC trains on the active equipment.
- Use of individuals to fill out units.
- Flexible integration, or the selected use of reserve units at different echelons to flesh out active forces as needed for the particular contingency.

Organization and Resources

As part of the research for this study, various force mixes (e.g., larger, more responsive, lower budget level, more integrated, greater use of associated concept) were tested against multiple scenarios, using existing RAND simulation models. For the Army to meet the military requirements of the various scenarios, the research team suggests several improvements. For

instance, the authors found that rounding out at lower levels and better integrating the AC and RC structure speeds deployment. Other suggestions include the following:

- Creating an RC personnel account.
- Creating an AC trainer command for post-mobilization training.
- Using more AC full-time support for RC peacetime training.
- Shifting support missions to RC, given rapid activation.
- More use of the associate concept.

In turn, for the Air Force, the study's authors found that wider use of the associate concept can speed deployment.

The study concludes with a series of observations and recommendations:

- With a large and robust AC, a more measured RC call-up is possible.
- With more support structure in RC, there is a need to call RC early.
- Rounding out at lower echelons is the best prospect for meeting early-deployment timelines.
- With a major contingency, RC combat forces need to be called to reduce risk from another contingency.
- Military planners should capitalize on the unique strengths of AC and RC.
- The AC must support the RC in peacetime and post-mobilization training.
- Planners should use the associate concept more widely to lower costs while improving the use of capital equipment.
- The military should build and maintain high levels of personnel with prior active service.

In our review of this study, we found that all of these observations and recommendations are still relevant.

Assessing the State and Federal Missions of the National Guard

While the preceding RAND study provides a service-by-service view of potential force mix alternatives, including potential RC roles, *Assessing the State and Federal Missions of the National Guard* (1995) offers a tighter focus on the National Guard. Specifically, the study's authors considered the capabilities of the National Guard to meet its state and federal responsibilities after the Cold War drawdown. The authors concluded that the size of the National Guard is adequate for its state and federal missions.

Organization

The only issue area covered in this study that may be particularly germane to the current review is organization. For federal missions, the authors note, the force structure of the National Guard is only partially employed in the most demanding of military scenarios: two major simultaneous regional conflicts. The authors conclude that this kind of scenario is—and should continue to be—the basis of Guard size rather than state missions, because the Guard is not used on state missions in large numbers for long periods. Further, it is

impractical to structure a system that takes into consideration not only federal demands but the demands of all U.S. states and territories. Instead, at the state level, the Guard is best suited as a *supplement* to other state resources, helping meet the primary state mission of emergency and disaster-relief operations. We offered this recommendation as potentially useful to the OSD review.

Assessing the Potential for Using Reserves in Operations Other Than War

In the last of the studies we summarize here, *Assessing the Potential for Using Reserves in Operations Other Than War* (1997), the authors assessed demand and supply of reserve forces for operations other than war (OOTW) and ways to remove impediments preventing greater use of these forces. Various operational factors were identified as commonly shaping the demand for forces in OOTW, including the needed capability, scope of operation, level of threat, prior agreements, any involvement with nonmilitary organizations, and the level of control. In turn, the authors observed that the supply of forces depends on availability, functional requirement (i.e., whether the force can do what it needs to), responsiveness, level of risk, political factors (e.g., perceived national importance and public acceptance), and accessibility.

Another factor that affects the RC use relates to service culture. The authors note that the culture of the Army and the Marines prizes unit integrity, whereas the Air Force and Navy cultures prize weapon system availability. These cultural factors can significantly influence the preferred use of reserves for various operations or contingencies. The Marine Corps, with its frequent use of smaller units for augmentation, has a high likelihood of using RC in OOTW. The Air Force and Navy also have a high likelihood of using RC in OOTW because of their ability to integrate on the level of the individual (rather than the unit). Finally, while the Army has a high likelihood of using RC *support* units, more impediments prevent it from using RC *combat* forces.

Ultimately, the authors present several ways for military planners to remove or reduce planning impediments to the use of the RC in peacetime contingencies:

- Consider RC early in tasks well suited for them.
- Challenge assumptions about RC responsiveness.
- Enhance staff interfaces.
- Include specific RC units in deliberate planning process.
- Identify, in advance, personnel and units with high-demand skills for peacetime contingencies.
- Use cost as consideration in force selection (RC versus contract).
- Resource high-demand RC units.

In our briefing to the sponsor, we noted that these recommendations may prove valuable in their review of the RC, as all three studies offer considerations of innovative uses of reserve forces. While some of the options may not be currently feasible or desirable, these studies represent an array of potential opportunities and thus may be well worth revisiting.

APPENDIX B

Selected Past RAND Arroyo Center Research on Reserve Components

At the request of the Office of the Assistant Secretary of Defense for Reserve Affairs (OASD[RA]), the RAND Arroyo Center produced an overview of past studies it had conducted that might prove pertinent to the Office of the Secretary of Defense's (OSD's) comprehensive Reserve Component (RC) review. These studies fall into two categories: homeland security and training.

Homeland Security and Possible Roles for the RC

In fiscal year 1999, the RAND Arroyo Center conducted a study on homeland security for the Deputy Chief of Staff for Operations (DCSOPS, now G-3).[1] This study, *Preparing the U.S. Army for Homeland Security: Concepts, Issues, and Options,* sought to (1) define homeland security (HLS) in a concrete way, (2) provide the Army and other DoD audiences with an introduction to, and overview of, the major HLS mission areas, and (3) provide the necessary background and conceptual and analytic constructs for wrestling with the key issues and choices the Army might face.

Although the study was not focused on RC issues in relation to homeland security, the role of the reserves did in fact arise. The following summarizes the principal results of this study, with an accent on RC-related issues.

Main Study Findings

At the time RAND was conducting its study, DoD had no agreed-upon definition of HLS, nor a clear taxonomy of mission areas that HLS embraced. Accordingly, one of the first orders of business for the study team was to define its terms. The study team's definition of *homeland security* is

> . . . all military activities aimed at preparing for, protecting against, or managing the consequences of attacks on American soil, including the CONUS and U.S. territories and possessions. It includes all actions to safeguard the populace and its property, critical infrastructure, the government, and the military, its installations, and deploying forces.

[1] Eric V. Larson and John E. Peters, *Preparing the U.S. Army for Homeland Security: Concepts, Issues, and Options,* Santa Monica, Calif.: RAND Corporation, MR-1251-A, 2001.

The study team identified five mission areas that we believed made up the core homeland security mission areas of concern to the Army:

- WMD preparedness and civil support
- continuity of government
- continuity of military operations
- border and coastal defense
- ballistic missile defense.

We did not address the fifth mission area—ballistic missile defense—in our study. We also concluded that, although other analysts probably would differ, counterdrug operations and routine enforcement of immigration and customs laws did not rise to the level of homeland security missions.[2]

We identified four key questions that need to be answered to properly size and shape military—and national—homeland security programs:

- What types and magnitudes of threats should we prepare for?
- What performance levels should we demand?
- What cost-effective options are available for providing the needed level of capabilities to yield these performance levels for our chosen magnitude of event?
- What are the costs and opportunity costs (e.g., the costs incurred when one must choose one option over another) of providing these capabilities?

The process of analyzing works as follows. National policymakers first must make a policy decision on the types and magnitude of events that planning and programs will hedge against. Next, they must decide on the level of performance that is required (e.g., high, medium, or low level, or risk or harm reduction) of DoD in its part of the national response. With these criteria specified, the Army and DoD would identify the most cost-effective joint-force packages that can provide the needed capabilities. Policymakers then compare the total cost of the homeland security program that provides the desired level of performance to the preferred allocation of budgets between homeland defense and traditional missions.

Our analysis of the *WMD preparedness and civil support* mission area suggested that, while threats generally were low, they were possibly growing, as was the possibility of surprise. Given an analysis of data on past terrorist incidents, we judged that chemical, biological, radiological, or nuclear (CBRN) attacks on the United States were less likely than attacks with firearms and high explosives, which themselves were judged to be low-likelihood or low-frequency events. Nevertheless, interest in these weapons—and some experimentation by groups such as Aum Shinrikyo, which released sarin nerve gas in the Tokyo subway system in 1995—suggested that the use of these weapons probably was not a matter of *if,* but *when* they ultimately would be employed against the United States.

A review of data on past terrorist incidents, and data and press reporting on successful preventions, led us to conclude that passive defenses and consequence management activities offered a lower payoff than did a wide range of civilian and military preventive

[2] Note: Post–9/11 developments and subsequent research for the Air Force have suggested a somewhat broader range of mission areas, falling either under homeland defense or civil support.

actions. These preventive actions include international cooperative efforts by civilian law enforcement and intelligence agencies, nonproliferation, cooperative threat reduction, and other programs that aim to restrict the availability of the most-dangerous weapons and technologies, and offensive military action. Passive defenses and consequence management activities should be considered a hedge against failures in prevention.

By comparison, we judged that the Army had a wide range of generalized and specialized units and reachback capabilities that could support WMD consequence management, but that a poor understanding of actual local and state capabilities was hindering the identification of new capabilities that could improve the performance of consequence management performance and was leading to capabilities, including RC units such as the Weapons of Mass Destruction Civil Support Teams (WMD CSTs), whose utility was somewhat questionable. We argued that, to ensure the best use of scarce resources, additional investments in military capabilities for consequence management—whether active or reserve—required a better understanding of the threat and the relative cost-effectiveness of various local, state, federal, civilian, and military solutions.

Our analysis of the *continuity of government* (COG) mission area suggested that, with many of the Cold War COG programs discontinued, it was important for the Army, DoD, and the national leadership to reacquaint themselves with these programs and to make sure that the programs are properly tailored to the emerging threat environment.

In addition, our work suggested that assisting local and state COG efforts might be important in light of concern in some quarters about the possible militarization of civilian society. Just as with federal COG activities, the quick restoration of local and state authority and governance should be viewed as a high-priority objective in situations in which they have been disrupted. This restoration most likely would be the responsibility of state Guard forces.

Our analysis of the *continuity of operations* mission area, which includes force protection, especially of deploying units, and protection of mission-critical facilities, systems, and higher headquarters and operations, suggested that there might be a higher probability of involvement for state actors who are seeking to disrupt a major U.S. military mobilization during a crisis or by terrorist groups acting on the behalf of—or in sympathy with—these state actors.

While we generally viewed impediments to COG as a future, rather than an imminent, threat, we also judged it prudent for the Army and DoD to begin planning now for the possibility of future attacks against military facilities, sea and air ports of debarkation, and other targets. In view of the nearly unlimited number of targets and the potential for displacement of attacks from well-protected to less-well-protected targets, we again judged that preventive efforts were likely to offer higher payoffs than passive defenses (e.g., hardening). Nevertheless, continuity and emergency-preparedness procedures could facilitate the restoration of military capabilities after an attack.

We also argued that the Army and DoD should begin thinking now about the possibility of threat campaigns involving multiple simultaneous attacks or an extended campaign of serial attacks; such campaigns, potentially involving attacks against population, government, and military targets, could well stress existing capabilities, especially if they occurred during a major military mobilization or war.

Our analysis of the border and coastal defense mission area focused on preventing weapons of mass destruction and other weapons and materials from being smuggled into the

United States and on managing large-scale refugee flows such as the past ones involving Cuba and Haiti.

We judged that the detection of weapons of mass destruction—especially nuclear weapons and materials—was of critical importance to the nation. However, we judged that the Army was less likely to play a prominent role in the intelligence, surveillance, and reconnaissance of U.S. borders, coastlines, and approaches than its sister services, the Navy and Air Force, or civilian agencies such as the Immigration and Naturalization Service, the Customs Service, and the Department of Energy.

We also judged, based upon the historical record of past Army involvement in refugee-processing operations, that the Army should anticipate playing an important role in managing future large-scale refugee movements, whether from Cuba, Haiti, or Mexico, or other countries of origin.

We deemed it somewhat unlikely that the Army would be called upon to make a long-term commitment to support routine border patrol operations. The temporary nature of the Guard's border patrol operations after 9/11 and the continued emphasis on civilian agencies for the performance of these functions seem to have confirmed that judgment.

Study Implications for the Reserve Component

Based on these findings, the key implications of the study for RC planning were that the high level of integration of the Total Force presented some potential future risks.

RC forces need to be available for a wide range of missions, from warfighting and peace and humanitarian operations abroad to homeland security, natural disasters, and other domestic operations. The high level of integration of RC forces complicates the management of dual-missioned forces (sometimes referred to as "deconfliction") and creates a strong potential that simultaneous demands on these forces may arise, and that one of the missions may, as a result, suffer. This situation suggests that policymakers may face a future dilemma in apportioning and allocating forces amongst these multiple missions.

The implication is that the Army and DoD need to ensure that there are clear procedures for the deconfliction of these demands. An added wrinkle is that there are a number of RC personnel who might be tapped for HLS or OCONUS missions who also are, in their civilian lives, first responders—firefighters, police, and emergency medical technicians, among others. It will be critically important to ensure that DoD demands on these "triple-missioned forces" are deconflicted with local and state demands as well.

Because both the threat environment and the cost-effectiveness of various military and civilian solutions were not yet well understood at the time of the study, we argued that it would be premature to begin the conversion of up to two divisions of the Army National Guard (ARNG), an option then under discussion. Instead, we argued that the Army's and DoD's focus should be on the exploration and development of operational concepts that might make cost-effective contributions to the overall layered architecture of local, state, federal, civilian, and military responders. Concept development, simulation analyses, trade-off and other studies, the fielding of prototype units, and operational experimentation all would be useful in vetting various alternatives. When superior alternatives could be identified, these units could be proliferated or scaled up as necessary.

In the end, however, Army and DoD force-structure decisions for homeland security should be based on the responsiveness of fielded units and their actual capacity to thin the

threat or mitigate harm. The overall aim should be the development of cost-effective, layered defense architectures made up of both civilian and military capabilities.

Post–9/11 Reflections on the Study

While we noted our concern about the apparently growing threat of attacks on the homeland, our study failed to anticipate the specific 9/11 attack or the magnitude of post–9/11 demands (for air sovereignty, border patrol, and the protection of other critical civilian infrastructure, such as airports, nuclear facilities, ports, bridges, and reservoirs). We had judged that the use of the military to defend point targets was unlikely to be very cost-effective and so did not anticipate that nearly 33,000 Army National Guard and Army Reserve soldiers might be called up to provide temporary security at airports and other facilities around the country, with some 1,500 National Guard troops, primarily from the Army Guard, assisting U.S. Immigration and Naturalization Service and U.S. Customs Service officials in eight states along the Canadian border and in the four states along the Mexican border,[3] and 6,000–9,000 Guardsmen in major airports across the country.[4] Because we had argued that the Army and DoD should begin deliberative planning for potential future homeland security demands, we did not anticipate the massive increases in funding and new organizations that arose in the aftermath of 9/11.

At the time of our study, the argument that defense of the nation was the most important national security priority had not fully translated into consideration of homeland security needs and options. As a result, homeland security was something of a low priority before 9/11. Also entirely unforeseen then were the change in strategy announced in the Quadrennial Defense Review (QDR) (released in September 2001)—a change that identified homeland security as the most important DoD activity—and the commitment of substantial new resources to homeland security to actually underwrite what otherwise would have been a rhetorical emphasis only. Nor did we anticipate the distinctions between homeland defense and civil security or fully appreciate the range of mission areas under each.

Still, we believe our study did a fairly good job of anticipating some of the key issues and concerns that would arise once homeland security became salient, including the potential for a substantial Army HLS role relative to its sister services, the limited nature of Army/DoD HLS leadership opportunities, the continued relevance of many HLS missions (e.g., COG, NSSEs), the undesirability of long-term commitments to standing watch (e.g., securing borders), the continued salience of public concerns about civil liberties and the militarization of U.S. society, the strong potential for misallocating resources, and the difficult trade-offs that would be faced in choosing among alternatives that could enhance homeland security.

Moreover, policymakers ultimately also seem to have reached the same conclusion that we did—i.e., that an emphasis on the military over civilian actors for homeland security would be unsustainable over the long term. Many also seem to have embraced the evolutionary and adaptive approach for converting RC forces to HLS missions that we recommended.[5] To date, however, we have seen little evidence that the DoD—or the federal

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[3] Gil High, "Briefings; America and the War on Terrorism," *Soldiers*, August 2002, p. 8.

[4] DoD, "Secretary White Briefing on Homeland Security," October 26, 2001.

[5] See "National Guard Wants to Convert Units to WMD Duty," Global Security Newswire, May 20, 2003, and Master Sergeant Bob Haskell, "National Guard Transforming to 'Modern Minutemen,'" *ArmyLink News*, May 22, 2003.

government—has been laying the foundations for the complex trade-off analyses that will be required to ensure that the nation's layered homeland security architectures, consisting of both civilian and military capabilities, are both effective, and cost-effective.[6]

The Reserve Component and Training

Beginning in the late 1990s, a series of RAND Arroyo research projects suggested that the RC could play a larger role in training the entire force, both AC and RC. More specifically, rebalancing the training force to provide a larger role for the RC could add significant capability and provide added flexibility to the total training system. The research first focused on the existing RC system of schools, concluding that reorganization and consolidation could add capacity by increasing internal efficiencies while increasing quality. Second, the research found that consolidating the AC and RC school systems led to increased savings and added flexibility for the training system as a whole.

Reorganization and Consolidation of RC Training System

In the mid-1990s, the Army launched a plan for consolidating RC training facilities and raising standards. Among the changes was the establishment of a regional system of RC schools that was functionally specialized in accordance with traditional Army branches. The Army's long-term goal was to establish a single Army School System, to include fully accredited and integrated training institutions from all components and to provide standard, high-quality training to both Active and Reserve Component soldiers.

The Army asked RAND to conduct a number of independent assessments of new school system operations, in the late 1990s. Researchers concluded that, while the Army was moving in the right direction with the new RC prototype, even greater improvements in performance and efficiency could by achieved, paving the way for greater RC participation in the Army's overall training mission. Among the suggestions for improvement were the following:[7]

- Make more efficient use of the training management system to maximize the amount of high-quality training output achieved, given the resources dedicated to the task. This maximization can be achieved by ensuring that key resources, including instructors, are more consistently available for scheduled classes and by reducing the number of unused training spaces (seats; available spaces for which nobody is present).

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[6] See the second white paper in this volume for more-recent thoughts on the prioritization of homeland security mission areas and other issues.

[7] The results of this research are summarized in J. D. Winkler et al., *The Total Army School System: Recommendations for Future Policy,* Santa Monica, Calif.: RAND Corporation, MR-955-A, 1999. A shorter summary is contained in *Improving Performance and Efficiency in the Total Army School System,* Santa Monica, Calif.: RAND Corporation, RB-3015, 1999. More-detailed companion reports include the following: J. D. Winkler et al., *Assessing the Performance of the Army Reserve Components School System,* MR-590-A, 1996; J. D. Winkler et al., *Training Requirements and Training Delivery in the Total Army School System,* Santa Monica, Calif.: RAND Corporation, MR-928-A, 1999; M. G. Shanley et al., *Resources, Costs and Efficiency of Training in the Total Army School System,* Santa Monica, Calif.: RAND Corporation, MR-844-A, 1997; and *Improving Training Efficiency: Lessons from the Total Army School System,* Santa Monica, Calif.: RAND Corporation, RB-3008, 1999.

- Achieve greater economies of scale by increasing student load (annual throughput for a training course, school, or base) and by better matching the supply of instructors to the demands for training. For example, analysis of a regional Combat Service Support Brigade in fiscal year 1995 showed that student load could be increased from 21,800 trained student days to 32,300 trained student days, nearly a 50-percent increase. The higher load is considered achievable because it represents the level of operation the Brigade agreed to when it accepted its mission for the training year.

The increase in student load would also indirectly increase training efficiency, where *efficiency* is measured by the average number of school man-days (days of instructor and school staff time) needed to produce 100 days of student training. The efficiency gain from the increase in school load was estimated at 10 percent, from a score of 59 (school man-days per 100 days of student training) to a score of 53.

Further gains in efficiency would be made possible by improving the match between the qualification of the instructor cadre and the training needs of the students. A better match would result in an increase in the average student/instructor ratio achieved, a ratio closer to the optimum recommended for individual training courses. For the same training brigade cited above, analysts estimated that an "achievable" increase in instructor utilization (as well as a small reduction in support staff) on top of the increase in training load could improve the efficiency score to 45 school man-days per 100 student days, an efficiency gain of 24 percent from the original 59, as follows:

- Customize the Table of Distribution and Allowances for the regional schools to give them more flexibility in meeting instructor requirements, and more tools for increasing the utilization of their instructors (as described above). This customization would happen in two ways. First, the requirements process, which determines the need for instructors, would not be standardized across organizations but would be customized for each school brigade and battalion in each region, and would be revised frequently. Second, the schools would be given more flexibility in making instructor substitutions when the balance of instructor needs suddenly changes.
- Leverage RC assets to help develop and deliver courseware. This inequality—too much instructional capacity and no way to "harness" it—is the largest identified problem relating to the quality of training. As another way to make use of excess instructional capacity, the RC could become more heavily involved in developing, maintaining, and continuing to modernize relevant courseware. Many RC instructors have the necessary qualifications and also have the additional advantage of being closer to the actual training than developers in the proponent schools.
- Establish a system for ongoing and systematic monitoring and assessment of training quality and efficiency, to identify new areas for improvement and to ensure that past gains are sustained. This system would supplement the accreditation process implemented as part of the reorganization plan. For example, problems with training courseware or training support could be monitored with a short, self-administered survey of instructors and school commanders; and training efficiency could be tracked via tabulations of school manpower in relation to student load.

Shifting AC Training Load to RC Schools

Once RC schools were reorganized to provide a greater capacity and ensure a higher quality, RAND undertook additional work to understand the feasibility and potential benefits of further integrating AC and RC schools, focusing on the areas of reclassification training and noncommissioned officer education. In particular, RAND undertook a project that looked at the potential for RC training institutions to begin providing training for AC students (and vice versa).[8] To conduct the analysis, the researchers employed an optimization model to explore the potential benefits of consolidating maintenance training across the components. Under the overall scheme, a soldier would be trained at the nearest accredited school, regardless of which component operated it. Moreover, on the basis of local demands, the RC would be allowed to expand its mission and train AC students.

Researchers looked at three options: nearest school, course reassignment, and consolidated schools. In the "nearest school" option, the optimization model simply assigns a student to the nearest school offering the needed training, regardless of component. The "course reassignment" option entails modifying courses offered at schools according to local demand. Either an AC school or an RC school can offer a course if there is sufficient local demand. This option has two variants: the "multifunctional" case offers a wide range of courses at an RC school; the "specialized" case allows only a limited range of related functional courses at an RC school. Finally, the "consolidate schools" option considers the total number of schools needed to meet the integrated training requirement. This option examines the potential for RC schools to assume new missions, such as establishing a regional training site for transportation courses, based on local demands.

The RAND study results imply multiple benefits. All three options promise travel cost savings. The "reassign courses (to multifunctional schools)" option saves the most; it costs only 53 percent as much as the baseline. All options also reduce the amount of time students must be away from home. The "amount of time separated" varied from 78 percent of the baseline for the "nearest school" option, to 89 percent for the "reassign courses (to specialty schools)" option. In addition to decreasing student travel costs and the time AC soldiers spent away from home station, the shift might also reduce the workload on the AC cadre, already stretched thin by staff reductions. Alternatively, the shift could potentially enable the Army to reduce the number of AC soldiers assigned as instructors, helping alleviate personnel shortages in units.

Relating to the broader issues discussed above, the integration of the AC and RC school systems would add significant capability and provide added flexibility to the total training system. The RC would add capability via the consolidation, because they could train additional AC students with minimal increases in resources. Given the existing underutilization of RC training instructors, it appeared to the study team that there would be little need for additional RC instructors to handle the increased AC course load. Considering support workforce requirements, the analyses showed that the number of people who support the schools by maintaining facilities, operating ranges, and so forth appears to be relatively insensitive to the training workload at the school. Therefore, increases at RC

[8] For the results of this research, see John Schank et al., *Consolidating Active and Reserve Component Training Infrastructure,* Santa Monica, Calif.: RAND Corporation, MR-1012-A, 1999; and *Bridging the Gap: Consolidating Active and Reserve Training,* Santa Monica, Calif.: RAND Corporation, RB–3009, 1999.

schools and decreases at AC schools would not significantly alter support workforce requirements.

The RC would also add flexibility to the training system as a result of the consolidation. For example, flexibility could be added (or instructor requirements reduced) by temporarily assigning RC instructors to alternative training locations to help meet surges in training workload. This practice could be accomplished by detailing the instructors from their assigned school to another school or by tapping the additional duty potential of part-time soldiers. To cite another example, RC instructors could increase overall instructor capacity further by taking on some of the AC reclassification requirement, allowing AC soldiers to take shorter Technical Area Tasks courses as opposed to the longer Advanced Individual Training courses.

As a result of this exploratory effort, the RAND Arroyo Center recommended that the Army use the RC for further experimentation in training integration. Specifically, it recommended that the Army implement a pilot test in the maintenance area to illuminate all the policy and resource implications of a potential consolidation. Such a test might involve selecting two or three RC regional training sites for maintenance, possibly sites located on AC installations, for conducting AC-configured courses.

APPENDIX C

Selected Past RAND Project AIR FORCE Research on Reserve Components

To assist in its review of the Reserve Component (RC), Office of the Secretary of Defense for Reserve Affairs (OSD [RA]) asked RAND Project AIR FORCE (PAF) to review its past research and summarize those studies most germane to its consideration of possible future RC roles. In a briefing presented to the Assistant Secretary of Defense for Reserve Affairs, we provided a summary of relevant ongoing research and an overview of a past RAND study, *Principles for Determining Air Force Active/Reserve Mix* (MR-1091-AF, 1999).

During the briefing, we focused on three themes that have dominated past PAF research on RC issues: *cost analysis, optimization,* and *personnel management.* Past cost analysis research addressed such issues as cost models, costing problems, considerations that influence force-mix decisions, measurements of readiness and capability, and cost implications of transferring C-141s to the RC.

One study, *Finding the Right Mix of Military and Civil Airlift, Issues and Implications,* Vol. 1, *Executive Summary* (MR-406/1-AF, 1994), assessed finding the right mix of military and civil airlift, given a changing world and increasing budget constraints. Although military airlift is more costly than civil airlift, military airlift has advantages that its civil counterpart cannot provide. Given the various advantages and disadvantages of different military and civil aircraft, the study considers the combination that would most cost-effectively meet the intertheater airlift needs of today's Air Force. To maintain necessary flexibility, there is a need to limit the amount of that shift and, at least initially, a need for the Air Force to be the operator of any civil-style transports that might replace retiring C-141s. Another important dimension is to use the chosen mix to the fullest potential.

Another report, *Guidelines for Planning the Cost Analysis of Active/Reserve Force Structure Change* (R-4061-PA&E/FMP, 1992), presents a set of guidelines for fully defining force-structure changes and for planning the execution of cost analyses involving force-structure change. The guidelines are presented in the form of a "generic" question list designed to extract the critical information missing from a vaguely worded force-structure alternative. The full question list is divided into three subject areas: (1) questions designed to extract the exact force-structure change; (2) questions addressing the transition tasks associated with the implementation of a proposed change; and (3) questions on those changes in resource and activity levels that can drive cost. With even qualitative answers, the analyst should be able to identify the full scope of a force-structure change and the major cost drivers that are likely to influence the final results. With that information, the analyst can either plan the detailed work of a longer cost analysis or properly qualify the results of an immediately required cost estimate.

As part of the congressionally mandated active/reserve assessment study, another RAND report, *Assessing the Structure and Mix of Future Active and Reserve Forces, Cost*

Estimation Methodology (MR-134-1-OSD, 1992), explains and illustrates the methods, assumptions, and data that RAND used to estimate the costs of alternative force mixes and structures for the Army and the Air Force. The costing task assisted in designing the alternatives, which were sized to meet two possible targets for long-run annual recurring costs: one similar to the existing defense Base Force program and the other consistent with recent proposals to reduce defense spending further.

The optimization research addressed force-structure issues by modeling interactions among wartime requirements, peacetime basing options, and manpower and personnel policies. *The Civil Reserve Air Fleet and Operation Desert Shield/Desert Storm* (MR-298-AF, 1993), investigates the activation of the civil Reserve Air Fleet (CRAF), which for the first time at the start of Operation DESERT SHIELD furnished commercial-airline assets to the command to assist in the massive deployment of U.S. troops and supplies to the Gulf region and in their return. To guarantee a robust CRAF for the U.S. national security, some enhancements are vital, including an effective mix of incentives for this voluntary program. In addition, policies are needed that shield air carriers from unreasonable risk; improve command, control, and communications; and minimize the inefficient use of commercial aircraft.

Finally, the personnel management research covered a wide spectrum, ranging from manpower procurement for the reserves to principles for the active/reserve mix. We also offered an overview of *Principles for Determining Air Force Active/Reserve Mix* (MR-1091-AF, 1999), which summarizes the fundamental principles applicable to contemporary active/reserve force mix questions and provides a coherent framework for evaluation. The research pursued two questions:

- What principles should be considered in force-structure decisions that affect the active/reserve mix?
- How do these principles interact with each other?

The study results were notional; however, researchers provided a framework for integrating the range of considerations (social or political factors, readiness, availability, personnel flow, and cost) that constrain force-mix decisions. The researchers also concluded that, although military planners and other decisionmakers must weigh the trade-offs between preparing for contingencies and for major theater wars, peacetime contingency demands should be given greater weight in force-mix decisions, especially for Air Force communities that experience high deployment-related stress.

APPENDIX D

Abstracts of Relevant RAND Research

In this appendix, we provide abstracts of many of the reports cited throughout this report and in Appendices A through C. The citations are listed from most recent (as of 2000) to the oldest (1992).

MR-1204-AF *The Air Force Pilot Shortage: A Crisis for Operational Units?* W. W. Taylor, S. C. Moore, C. R. Roll. 2000.

The Air Force is facing a pilot shortage that is unprecedented in its peacetime history. The FY99 shortfall exceeded 1,200 pilots, and by FY02 it is projected to grow to about 200 pilots, almost 15 percent of the total requirement. Unprecedented losses are occurring for pilots reaching the end of their initial active-duty service commitment, as well as for pilots who complete bonus-related obligations. Since FY97, three pilots have left active duty for every two new pilots the Air Force has trained. Half of the shortfall occurs among fighter pilots, which has implications for combat capability and operational readiness. Operational units (i.e., those with combat responsibilities) are the only assignment options for newly trained pilots while they mature and develop their mission knowledge. Thus, these units require enough experienced pilots (those who have completed at least one operational tour in the mission aircraft) to supervise the development (or "aging") of the new pilots. As the proportion of experienced pilots in a unit drops, each one must fly more to provide essential supervision and to extend the time needed to become more experienced himself/herself. This report, dealing with operational fighter units, quantifies these experience problems and examines options that can alleviate them. The options include Total Force alternatives, such as associate programs in active units and "aging" active pilots in Guard and Reserve units. Advantages and pitfalls are described for each option.

MR-928-A *Training Requirements and Training Delivery in the Total Army School System.* J. D. Winkler, J. Schank, M. G. Mattock, R. Madison, D. Green, J. C. Crowley, L. L. McDonald, P. Steinberg. 1999.

Focusing on a "prototype" reorganized school system in its baseline and execution years (fiscal years 1994 and 1995) and comparing it to the system as a whole, this report analyzes the Reserve Component school system's ability to meet training requirements for noncommissioned officers (NCOs) and for soldiers who are not duty-MOS qualified (DMOSQ). In terms of training NCOs, requirements are large but decreasing, and capacity is better able to meet demand; however, utilization of that capacity is inefficient and growing worse, leading to a slight decline in graduates. In terms of DMOSQ training, requirements are decreasing,

capacity is increasing, and utilization is improved but still problematic, leading to an increase in graduates. The prototype compares favorably to the system as a whole in both of these areas. The report recommends increased management oversight and new policies to improve the utilization of training capacity throughout the school system. It also recommends inclusion of new personnel management policies to reduce demands on the training system—e.g., by offering incentives to reduce voluntary job turnover and attrition among DMOSQ soldiers, because much of this turbulence is shown to be driven by personnel, not by force structure.

MR-955-A *The Total Army School System: Recommendations for Future Policy.* J. D. Winkler, M. G. Shanley, J. Schank, J. C. Crowley, M. G. Mattock, R. Madison, L. L. McDonald, D. Green, P. Steinberg. 1999.

While the RC system continues to have large training requirements, its ability to meet those requirements has grown; still, quota utilization remains a problem. Manpower resources continue to dominate costs, reinforcing the need to improve efficiency. This report summarizes the Arroyo Center's analysis of the Reserve Component (RC) school system and the prototype over two fiscal years (1995 and 1996) in the areas of training requirements and school production, training resources and costs, and training quality. Analysis shows that various strategies can improve efficiency from 10 to 24 percent; in addition, while consolidating annual training sites can yield efficiency, consolidating individual duty for training sites does not. The quality of training courseware continues to be the paramount issue, and, although instructor qualification is not a problem, finding enough qualified instructors continues to be.

MR-992-A *Staffing Army ROTC at Colleges and Universities: Alternatives for Reducing the Use of Active-Duty Soldiers.* C. A. Goldman, B. R. Orvis, M. G. Mattock, D. A. Smith, R. Madison, L. L. McDonald. 1999.

The increased tempo and range of military operations, coupled with reduced manned levels, are exerting pressure on the Army to use its active-duty soldiers more optimally. Consequently, the Army is seeking opportunities to fill positions now occupied by active-duty soldiers with other personnel. Specifically, Umbrella Issue 41 of the Army-wide Institutional/TDA (Table of Distribution and Allowance) Redesign Study called for the design and testing of staffing alternatives for the Senior Reserve Officer Training Corps (SROTC) program, using a combination of AC, RC, or former military personnel. In support of this requirement, the Arroyo Center was asked to develop staffing alternatives and design a test of their effectiveness. This report discusses alternatives to current SROTC battalion staffing in which many active-duty soldiers who perform teaching or training functions would be replaced by reservists or by contracted civilians with former military service. Also, civilians would be contracted to help cover administrative and logistics functions now performed by active-duty soldiers. The authors recommend testing two alternative staffing plans, each over a period of two years. One plan focuses on former military personnel, the other on reservists.

MR-1091-AF *Principles for Determining the Air Force Active/Reserve Mix.* A. A. Robbert, W. A. Williams, C. R. Cook. 1999.[1]

Although the mix of active and reserve forces constituting the total Air Force has shifted, reductions during the last decade's force drawdown have not been proportional and may not have taken into consideration effects on other components. This report sets forth a set of principles to help force planners and programmers recognize the implications for the cost, effectiveness, sustainability, and popular and political support of military forces. A framework is provided for integrating the range of considerations that decisionmakers face and for gaining perspective on the arguments voiced by interest groups who hope to influence the force mix. The authors find that cost considerations can cut in opposite directions, depending on whether the force is being optimized for major theater war preparedness or for peacetime contingency operations.

MR-1012-A *Consolidating Active and Reserve Component Training Infrastructure.* J. Schank, J. D. Winkler, M. G. Mattock, M. G. Shanley, J. C. Crowley, L. L. McDonald, R. Madison. 1999.

As part of a research project entitled "Evolution of the Total Army School System," this report examines ways to consolidate training infrastructure and augment capabilities across components to gain efficiency and achieve economies of scale in conducting individual training of AC and RC soldiers. Using an optimization model, the researchers examined three options in the area of maintenance-related training, focusing on RC Regional Training Sites–Maintenance (RTS-Ms) and the AC proponent schools offering maintenance courses. Results suggest that permitting AC and RC students to take courses at the nearest accredited school (AC school or RTS-M) has both economic and morale/cultural benefits. The former include reductions in travel, per-diem, and potential instructor costs. The latter include reductions in the time AC students spend away from their homes and units, lower training workloads for AC instructors, and more interaction, potentially building trust and confidence across components. Such interaction could also provide benefits in functional areas beyond maintenance, such as combat service support. The researchers recommend a pilot test to better understand the options and policy implications.

MR-943-OSD *The Effect of Mobilization on Retention of Enlisted Reservists After Operation Desert Shield/Storm.* S. N. Kirby, S. Naftel. 1998.

This report discusses how reserve mobilizations affect the attitudes, perceptions, and behaviors of reservists, their families, and their employers. Understanding the effects of mobilizations and deployments is important because mobilizations have the potential to alter retention and future recruiting, and could eventually reshape the reserve force in perhaps unforeseen ways. Using the 1991 Guard/Reserve Survey of Officers and Enlisted Personnel, the authors examined whether and how factors affecting reenlistment have changed since the last large-scale survey of reserve forces in 1986; examined the differences in behavior of mobilized and nonmobilized reservists to determine whether mobilization itself has had an

[1] See also discussion in Appendix C.

effect on retention; and investigated whether mobilizations affected reservists' work, family environments, and economic positions.

MR-921-A *Meeting Peace Operations' Requirements While Maintaining MTW Readiness.* J. M. Taw, D. Persselin, M. Leed. 1998.

Peace operations (POs) are arguably the military operations other than war most likely to stress the U.S. Army's ability to maintain combat readiness. POs require: a higher ratio of combat support/combat service support units and special operations forces relative to combat arms units than do major theater wars (MTWs); smaller, more tailored deployments; training for some new tasks and, more important, for a more restrictive and sensitive operational environment; and readier access to—and more of—some kinds of equipment (such as crowd- and riot-control gear, nonlethal weapons, and vehicles). At a time when the Army is shrinking, changing its posture, and participating in a rising number of exercises and operational deployments, its challenge is both to maintain MTW readiness (its primary mission) and meet the very different requirements of POs. As long as MTWs remain the national priority—and thus the Army's—the Army can make some marginal changes to force structure, training, and doctrine that will help improve PO performance while also mitigating the effects of PO deployments on MTW readiness. If POs become a higher priority, and resources remain constrained, the Army will have to trade off some MTW capabilities to better meet PO requirements. These challenges must also be viewed in light of existing Army problems (such as maintaining units at levels below normal strength and overestimating the readiness of the Reserve Component), which transcend POs but are severely exacerbated by PO deployments.

MR-844-A *Resources, Costs, and Efficiency of Training in the Total Army School System.* M. G. Shanley, J. D. Winkler, P. Steinberg. 1997.

This report analyzes the resource use and efficiency of the RC's new prototype school system, established in the southeast section of the United States (Region C). The assessment of outcomes in FY95 (the execution year of the prototype) is based on data collected in both FY94 (the baseline year) and FY95 in Region C and Region E, a comparison region in the Midwest. The document also discusses ways to further improve resource use and efficiency in the future—primarily by more fully utilizing school-system capacity. Because the school system is currently falling far short of meeting RC training demand, the authors focus on more effectively using current school resources rather than on achieving manpower or dollar savings. However, if training requirements decrease in the future, the results of this research could be applied to achieve resource savings. This report is part of a larger effort by the RAND Arroyo Center to analyze the performance and efficiency of the RC school system.

DB-209-OSD *Equipping the Reserve Components of the Armed Services: Summary of Findings and Recommendations.* R. A. Brown, L. Lewis, J. Y. Schrader, W. W. Taylor. 1997.

Equipping the RC has become an increasing concern over the past 20 years, both because the nature of prospective military operations has changed and because technology has advanced. Different types of operations, for example, require different mixes and amounts of equip-

ment. Further, each service uses, structures, mixes, and equips its active and reserve forces differently than others. This study researched service policies and procedures to establish a descriptive baseline of the way RCs are to be equipped. It included both a top-down review effort that describes the process in each of the military services and a bottom-up assessment of selected items of equipment, using a case-study methodology to determine the effectiveness of these policies and to identify any systemic problems affecting execution. Finally, it provides an overall assessment of identified equipping problems and makes recommendations for improvement.

MR-812-OSD *Costs and Benefits of Reserve Participation: New Evidence from the 1992 Reserve Components Survey.* S. N. Kirby, D. W. Grissmer, S. Williamson, S. Naftel. 1997.

Recent greater reliance on reserve forces has made it important to understand how reserve mobilizations affect the attitudes, perceptions, and behaviors of reservists, their families, and their civilian employers. The report examines these issues in two ways. First, it compares survey data collected from reservists in 1986 and 1992. Second, it compares responses from mobilized and nonmobilized reservists who were questioned in the 1992 survey. Understanding how mobilizations affect reservists is important for several reasons, especially because mobilizations might change reservists' attitudes about reserve service in significant ways, eventually affecting retention and recruiting in future years.

MR-796-OSD *Assessing the Potential for Using Reserves in Operations Other Than War.* R. A. Brown, J. Schank, C. J. Dahlman, L. Lewis. 1997.[2]

This study documents an analysis of the potential of using U.S. RC in overseas peacetime contingency operations. The analytic framework is demand (operational needs) versus supply (forces and capabilities). The authors examine the joint planning process, the criteria force providers use to select forces, and the resource and institutional respects of service cultures that contribute to (or impede) how and when reserves are employed. Particular attention is paid to impediments to the selection and use of the Reserve Components in peacetime contingencies and to whether force-mix changes might improve the responsiveness of U.S forces. The authors recommend increased staff knowledge of reserve capabilities (and limitations), considering RC use earlier in the planning process, and bringing full-time reservists into key staff elements. Further, the authors recommend changes to improve the force-selection decision process.

MR-852-A *Army Forces for Operations Other Than War.* R. E. Sortor. 1997.

National military strategy has changed the focus of military planning to include a broader range of missions, which span the spectrum from major regional contingencies (MRCs) to operations other than war (OOTW). This change leads to a key planning question: How should the AC and the RCs be structured to meet the Army's evolving requirements? The first portion of the research was documented in MR-545-A. The present report describes results from the second portion, which sought to determine the Army forces required for

[2] See also Appendix A.

OOTW and to study how these requirements might affect the Army's ability to execute an MRC with the planned forces. This analysis indicates that, for the most part, the present force is adequate in unit type and number; OOTW requirements add only very slightly to some of the shortfalls in the Army-desired MRC capability—shortfalls that already exist in the absence of an OOTW. Results highlight the need to consider OOTW effects beyond the units actually deployed to an operation. Cross-leveling, tailoring, and deployment of partial units all place added demands on the Army's ability to manage the readiness and availability of the force. These OOTW demands may require accommodation in terms of unit structure and manning in order to have a sufficiently robust capability. The RCs can play a greater role in this regard, although probably not through increased direct participation in OOTW contingencies.

DB-186-A *Reserve Component Linguists in Civil Affairs and Psychological Operations.* R. E. Sortor. 1996.

This study analyzes the reasons for the shortage of Reserve Components (RC) linguists in civil affairs (CA) and psychological operations (PSYOP). In 1995, less than 10 percent of the RC language requirements in CA and PSYOP could have been met with personnel possessing even elementary proficiency. The results indicated that the shortage does not result from recruiting or retention problems, nor from a lack of proficiency. Overall manning was over 90 percent, and retention of linguists serving in positions requiring language proficiency was above 80 percent. Data also indicated that over 40 percent of the linguists met the limited working proficiency standard and over 80 percent maintained elementary proficiency levels. The shortage results from the fact that too few linguists received initial language training and trained linguists were not used efficiently. The lack of agreement on language requirements and a shortage of initial training opportunities have led to persistent shortfalls in linguists. In addition, many trained linguists are not being used in appropriate positions; less than half of them serve in positions requiring foreign-language proficiency, and less than 10 percent are assigned to positions requiring their specific language.

MR-659-A *Ensuring Personnel Readiness in the Army Reserve Components.* B. R. Orvis, H. J. Shukiar, L. L. McDonald, M. G. Mattock, M. R. Kilburn, M. G. Shanley. 1996.

Many of the units the U.S. Army plans to deploy in response to future contingencies are in the RC. Although, ideally, all such units would be manned at a wartime state of readiness, such a state is infeasible in reality. Part of the current mobilization plan, accordingly, is a practice termed "cross-leveling"—moving soldiers from one unit to another to ensure that each has enough qualified soldiers for the required jobs. This practice was employed extensively in Operation DESERT SHIELD/STORM and was regarded as largely successful. But even though cross-leveling can be a cost-effective means of ensuring unit deployability, it is not the ideal solution for reserve readiness problems. The greater the reliance on cross-leveling is, the lower is the likelihood that units will have had peacetime individual and collective training adequate to permit cohesive performance of their wartime mission. This project examined the extent of cross-leveling during DESERT SHIELD and DESERT STORM, the reasons for cross-leveling, the likelihood of serious personnel shortfalls in future deployments, and, based on the findings, the types of policies that could enhance the

RC's readiness to deal with future contingencies. The analyses make it clear that there are personnel-readiness shortfalls worth fixing in the Army RC and that reducing personnel turnover is the key to accomplishing that goal. They also suggest that reducing job turbulence—the tendency of soldiers to switch jobs—is likely to cost less than reducing attrition, but incentives to reduce both types of turnover will be required for many RC units.

MR-681/2-OSD *Enlisted Personnel Trends in the Selected Reserve, 1986–1994.* R. J. Buddin, S. N. Kirby. 1996.

MR-681/1-OSD *Enlisted Personnel Trends in the Selected Reserve, 1986–1994: An Executive Summary.* S. N. Kirby, R. J. Buddin. 1996.

This study focuses on the time period since Operation DESERT STORM/SHIELD, when reserve forces have been drawing down even as fiscal constraints are placing a high priority on using reserve forces wherever they can meet deployment dates and readiness criteria. Reserve forces are expected to play an important role in responding to regional crises, as well as in peacekeeping, peace enforcement, and humanitarian assistance operations. These roles and missions, combined with the downsizing of both the active and reserve forces, make it critical that the reserve be able to meet the manpower and readiness requirements called for in U.S. national military strategy. In particular, researchers examine changes from FY89 through FY94, pointing to some potential areas of concern with respect to reserve manning in the future.

MR-590-A *Assessing the Performance of the Army Reserve Components School System.* J. D. Winkler, M. G. Shanley, J. C. Crowley, R. Madison, D. Green, J. M. Polich, P. Steinberg, L. L. McDonald. 1996.

The U.S. Army is launching a series of initiatives that serve both the active and reserve forces. The eventual aim is to develop a Total Army School System (TASS) that would be more efficient and integrated across the AC and the Army's two RCs, which include the Army National Guard and the U.S. Army Reserve. Prominent among these initiatives is a prototype regional school system the Army established and tested in the southeastern region of the United States during fiscal years 1994 and 1995. This report provides a baseline description of the RC training system and an outline of how the prototype may affect the range of problems described by the data. It provides a starting point for assessing school system performance and observing how this performance changes in response to restructuring initiatives.

MR-646-OSD *Total Force Pilot Requirements and Management: An Executive Summary.* H. Thie, W. W. Taylor, C. M. Levy, S. N. Kirby, C. M. Graf. 1995.

This report examines the supply of and demand for pilots and addresses the questions of whether future shortages will become widespread and not confined to just one military service; whether shortages would affect both Active and Reserve Components; and what might be done to alleviate a shortage problem. Researchers focus on military pilots in the active Air Force, the Air Reserve Component, the Navy, and the Naval Air Reserve. The study outlines

the historical trends in accessions, retention, and transfer rates of pilots between the active and reserve forces. It also discusses the current, and changing, requirements for pilots in both military and civilian life. Finally, it discusses the current personnel and training policies used to manage pilot accessions and retention and offers some thoughts on how effective these policies will be in light of changing requirements.

MR-557-OSD *Assessing the State and Federal Missions of the National Guard.* R. A. Brown, W. Fedorochko, J. Schank. 1995.[3]

A series of developments has focused attention on the important domestic mission responsibilities of the National Guard. These developments included a succession of domestic disasters and emergencies, the passage of new legislation authorizing the Guard to participate in domestic initiatives designed to alleviate pressing national problems, the emergence of State Governors' concerns about the consequences of reducing the National Guard, and the Secretary of Defense's Bottom-Up Review, which acknowledged the need to support domestic missions. These developments contributed to existing concerns that a smaller National Guard would be unable to meet both state and federal mission requirements. This study investigates whether the projected size of the Guard, planned through FY 1999 will be adequate; whether the current system of assigning federal missions to Guard units could be altered; whether it is advisable or feasible for states to engage in cooperative agreements to share Guard capabilities; and whether alternative federal-state cost-sharing arrangements should be implemented for Guard units whose principal function is to support state missions.

MR-545-A *Army Active/Reserve Mix: Force Planning for Major Regional Contingencies.* R. E. Sortor. 1995.

RAND research is ongoing on how changing national military strategies and resources might affect the mix of active and reserve forces in the Army. This report documents results from the research and describes the portion of the research focused on the forces required for major regional contingencies and on the Army forces planned for the late 1990s and the early 21st century. The results of the analysis show that, under current planning assumptions, the planned combat force is adequate even when judged against a scenario with two nearly simultaneous contingencies. However, unlike the case of the combat forces, it does not appear that the planned support force structure would provide the required number of units at the needed readiness level to support anything beyond a single modest-sized contingency. Support units other than those in the high-priority contingency force pool do exist in the general war forces; however, given their lack of priority for resources, they may not be ready to deploy in time. This finding suggests a need to reexamine the support force configuration and reassess readiness in support units.

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[3] See also discussion in Appendix A.

MR-474-A *Training Readiness in the Army Reserve Components.* R. E. Sortor, T. Lippiatt, J. M. Polich, J. C. Crowley. 1994.

This report documents research on the training readiness of high-priority Army RC units participating in 1992 in the Army's training-enhancement program, known as BOLD SHIFT. The authors seek to understand the training achievements and shortfalls that were experienced, to identify key factors underlying training readiness, and to suggest potential improvement. The main features of the BOLD SHIFT program—training to more realistically attainable pre-mobilization goals, new concepts for field training, and closer ties between the Active and Reserve Components—seem to be moving in the right direction and are well worth continuing. While successful in many dimensions, the program was not able to bring most of the units to their pre-mobilization training and readiness goals. In all cases, *personnel readiness*—having sufficient trained and deployable personnel—is a fundamental challenge.

MR-379-A *The American Armies: 1993.* M. Taw, P. A. McCarthy, K. J. Riley. 1994.

This report examines the effects of the changing international environment on the U.S. military and the Army in particular. The report argues that problems posed by changing threats and dramatically reduced budgets that confront the U.S. military confront the Army more acutely. As a result, the Army must broaden its capabilities, adjust its roles and missions, and compete with the other services—all in the face of manpower and budget cuts. While the Army will respond through such internal means as relying more on technology and rethinking its use of the reserves, the report argues that cooperation between the American armies could counteract some of the effects of the drawdown and decreasing defense budget. For example, sharing (rather than duplicating) disaster-relief equipment and training, combining counterdrug operations, and leveraging off the Canadian Army's expertise in international peacekeeping could help optimize limited resources. The report concludes that, before any of these efforts can take place, the countries of the region must redefine their political and military relationships to prevent being constrained by residual fears of imperialism.

MR-289-RA *Skill Qualification and Turbulence in the Army National Guard and Army Reserve.* R. J. Buddin, D. W. Grissmer. 1994.

Improving the personnel and training readiness of Selected Reserve units requires, among other things, identifying problems in meeting readiness goals, the causes of these problems, and likely solutions. This report addresses the issue of individual job training in the Army National Guard and Army Reserve. For several reasons, a significant proportion of reservists in units are not even minimally qualified in their assigned jobs. These reasons include the large share of prior-service personnel requiring retraining, the large number of reservists who change units and jobs over their career, and the force retraining required when the force structure changes or is modernized. This research establishes a job-tracking system for reservists and used that system to measure job-qualification levels in different units and jobs. It also measures the frequency of assigned job changes and provides evidence on the causes of such changes. Finally, it measures average retraining times for reservists changing jobs.

MR-362-OSD *Prior Service Personnel: A Potential Constraint on Increasing Reliance on Reserve Forces.* D. W. Grissmer, S. N. Kirby, R. J. Buddin, J. H. Kawata, J. M. Sollinger, S. Williamson. 1994.

This report investigates the connection between the size of the AC and the readiness of the RC. Personnel who leave the active force provide an important source of experience for the reserves. Congress has passed legislation that directs sharply increased levels of prior-service personnel for the Army National Guard. However, under current policies, it will be difficult—if not impossible—to increase the prior-service content in the reserves while reducing the size of the Active Component. The report analyzes the ratio between Active and Reserve Components, describes the current mix of prior- and non–prior-service personnel in the reserves, projects how the prior-service content would change with different force structures, and presents a menu of policy options designed to boost the prior-service content of the reserves.

MR-406/1-AF *Finding the Right Mix of Military and Civil Airlift, Issues and Implications.* Vol.1, *Executive Summary.* J. R. Gebman, L. J. Batchelder, K. M. Poehlmann. 1994.

Intertheater airlift provides DoD with the ability to deliver combat forces or humanitarian relief rapidly anywhere in the world and to respond quickly to changing circumstances. But the national security strategy is being adapted to fit a changing world, and budget constraints are increasing. Military airlift is more costly than civil airlift, but military airlift has advantages that its civil counterpart cannot provide. Given the various advantages and disadvantages of different military and civil aircraft, this study considers the combination that would most cost-effectively meet the intertheater airlift needs of today's Air Force. To maintain necessary flexibility, there is a need to limit the amount of that shift and, at least initially, a need for the Air Force to be the operator of any civil-style transports that might replace retiring C-141s. Another important dimension, however, is to use the chosen mix to the fullest potential.

MR-504-A *Assessment of Combined Active/Reserve Recruiting Programs.* R. J. Buddin, C. E. Roan. 1994.

This report examines the long-term effects of an experimental Army program that links active and reserve tours. The program, called the "2+2+4 recruiting option," allows new entrants to serve a 2-year tour in the AC, a 2-year tour in a Selected RC unit, and then 4 years in the Individual Ready Reserve. RAND designed the new enlistment option and evaluated the program in a congressionally mandated, controlled experiment. An earlier study showed that the program expanded the market for high-quality enlistees and helped staff hard-to-fill Army occupations. This study shows that 2+2+4 participants are more likely to complete their AC tour and join an RC unit than are other high-quality recruits. Program participants had lower first-term attrition and lower reenlistment rates than other high-quality recruits, so the program increased the pool of soldiers separating from the AC and available to the RC. In addition, the RC affiliation rate was 80 percent for 2+2+4 participants, as compared with only 43 percent for other recruits. The study concludes that the program helps the AC

achieve its recruiting objectives and that it channels trained, experienced personnel into the RC.

MR-258-A *Army Reserve Component Accessions from Personnel Completing Their First Active-Duty Enlistment.* R. J. Buddin, S. J. Kirin. 1994.

The planned restructuring of the Army AC will affect the size and composition (occupation, paygrade, recruit quality) of the prior-service accession pool available to the RC. This report examines factors that affect whether prior-service personnel affiliate with RC units. The goal was to identify soldiers who are likely to join the RC and understand what can be done to improve the rate of transition of prior-service soldiers into the reserves. The study focuses on the transition rates of active-duty first-term soldiers into the RC. A major finding of the research is that recruits with shorter terms of service in the AC are substantially more likely to join the RC at the completion of their AC tour. Holding constant other recruit characteristics, about 50 percent of 2-year enlistees join the reserves as compared with 40 and 30 percent of 3- and 4-year enlistees, respectively. This finding suggests that a shift to shorter terms might ease RC manning problems, because it would cycle people who are disposed to joining the RC more quickly through the AC.

MR-298-AF *The Civil Reserve Air Fleet and Operation Desert Shield/Desert Storm.* M. E. Chenoweth. 1993.

This report investigates the activation of the Civil Reserve Air Fleet (CRAF), which the military Airlift Command (predecessor of the Airlift Mobility Command) called up for the first time at the start of Operation DESERT SHIELD. From August 1990 to May 1991, CRAF furnished commercial airline assets—passenger jets, cargo transports, and crews—to the command to assist in the massive deployment of U.S. troops and supplies to the Gulf region and in their eventual return. To guarantee a robust CRAF for U.S. national security future, some enhancements are vital. An effective, modern mix of incentives for this volunteer program is necessary. Also, policies that shield air carriers from unreasonable risk; improve command, control, and communications; and minimize the inefficient use of commercial aircraft and crews should be developed.

MR-303-A *The Army's Role in Domestic Disaster Support: An Assessment of Policy Choices.* J. Y. Schrader. 1993.

This report begins identifying the central issues for determining the appropriate Army role in disaster relief. The study finds three potential options for an expanded Army role in civil emergency response: (1) continue to support the Federal Emergency Management Administration's leadership of disaster-response planning; (2) expand the Director of Military Support office to include formal state liaison offices; and (3) designate civil disaster support as a fifth pillar of national defense strategy and incorporate disaster-support missions into the Army's primary missions. The last two options expand the Army's current role and will require both internal changes and outside actions. While weighing these options and examining the issues surrounding them, the Army should take three steps to make its force ready to meet the current expectations of the American people in the event of a disaster at home:

(1) transfer executive authority of military support from the Secretary of the Army to the Chairman of the Joint Chiefs; (2) support formal acceptance of civil disaster response as a mission for both active and reserve forces; and (3) review legal constraints on military participation in civil disaster relief.

MR-224 *Reserve Supply in the Post-Desert Storm Recruiting Environment.* B. J. Asch. 1993.

This study lays the groundwork for formulating future military reserve recruiting policy following the end of DESERT STORM.

R-4269/4-AF *Project AIR FORCE Analysis of the Air War in the Gulf: An Assessment of Strategic Airlift Operational Efficiency.* J. Lund, R. Berg, C. Replogle. 1993.

The 1990 airlift during Operation DESERT SHIELD moved ten times the daily ton-miles of the Berlin Airlift. In the main, this airlift operation was successful, but it did not attain expected performance. Operations began without a feasible transportation plan, and requirements changed frequently as the situation developed. Half the Air Mobility Command's strategic aircrews are in the reserves; they were not called up until 16 days into deployment. The small number of en route and offload bases made the entire system sensitive to disruptions at those bases, such as weather or ramp congestion. Maintenance problems resulted in aircraft unavailability. Among other suggestions, the authors recommend that (1) knowledgeable transporters be included early in contingency planning to ensure the feasibility of courses of action, (2) access to adequate bases be ensured both en route and in the theater, (3) measures be taken to ensure that the U.S. Transportation Command or the Air Mobility Command has sufficient aircrews in a crisis, (4) the aging C-141 fleet be replaced by C-17s.

MR-123-A *Planning Reserve Mobilization: Inferences from Operation DESERT SHIELD.* R. E. Sortor, T. Lippiatt, J. M. Polich. 1993.

This report identifies problems and issues raised by Operation DESERT SHIELD (ODS) that could affect the Army's use of reserves in future contingencies and summarizes issues that merit further analysis. It argues that ODS departed from past reserve planning because there was little warning and no specific deployment plan for using the reserves in such a contingency. Based on this experience, issues relevant for future operations include: reviewing the 200K call-up mechanism (the means by which the U.S. President can call up 200,000 reservists during a national emergency); taking measures to reduce assembly and movement time; developing guidelines to specify post-mobilization training activities; examining the role of reserves in sustaining an extended deployment; preparing active and reserve units for a range of scenarios; and conveying the idea that training and unit relationships in peacetime may be changed abruptly in a contingency.

MR-195-A *Overview of the Total Army Design and Cost System.* R. L. Petruschell, J. H. Bigelow, J. G. Bolten. 1993.

This report describes an integrated collection of models, procedures, and databases called the *Total Army Design and Cost System,* which is designed to address a broad range of force-structure and resource-allocation issues and to determine the resource implications of narrower but more-detailed proposed changes within the framework of the total Army. The first element of the system—the Theater Support Model—estimates the number of support units needed for the combat forces. The Total Force requirement is then passed to the Transition to War Model, which determines the future peacetime Army, including Active and Reserve Components, needed to provide the necessary forces, given a desired deployment schedule. The Path Model then compares the present force with the desired future forces and provides a road map—a series of inventories of Army units, beginning with the present force and ending with the desired future force—to follow in achieving the future force. The Total Army Cost Model completes the final step of translating the inventories into annual cost and resource requirements.

DB-100-AF *Guard and Reserve Participation in the Air Mobility System.* P. S. Killingsworth, R. Berg, S. C. Moore, D. Randle, C. Replogle, M. G. Shanley, D. Todd. 1993.

Mobility forces are being called on as never before to support U.S. foreign policy objectives, especially for short-notice, high-priority missions. As a result, the capabilities of active-duty aircrews and aircraft have been stretched to the limit. This increase in demand has raised the question of whether and how the Air Force Reserve and Air National Guard should be utilized for flying peacetime missions. This study examines the historical role of the Reserve and the Guard within the mobility system in order to provide answers. It suggests a number of directions the Air Mobility Command (AMC) might follow to reduce today's stresses on the air mobility system. Whatever combination of solutions is employed, priority must be given to quick-reaction, high-flexibility resources.

MR-140/2-OSD *Assessing the Structure and Mix of Future Active and Reserve Forces, Final Report to the Secretary of Defense: Executive Summary.* 1993.

This executive summary presents the major findings and conclusions of a study examining the structure and appropriate mix of active and reserve forces. The study analyzes policy issues surrounding the Total Force (that is, active and reserve forces), to include Total Force history and its effectiveness during the Persian Gulf War. It also evaluates several mixes of active and reserve forces, assuming a range of manning and funding levels. With respect to land forces, the study estimated the length of time it took different types of units to prepare for combat, concluding that the reserve support units were the most critical because they managed the overseas deployments, but the readiness of reserve combat units was the most controversial. The study estimated it would take 128 days to prepare a brigade-sized unit for combat. A number of techniques could reduce that time, but rounding out active units at a lower level (e.g., company or battalion) offered the greatest potential for saving time. The study contains detailed analyses of force structures for Army, Navy, Air Force, and Marine

Corps units. It also addresses the ability to sustain different reserve structures and ways to improve the readiness of reserve combat forces.

MR-124-A *Post-Mobilization Training of Army Reserve Component Combat Units.* T. Lippiatt, J. M. Polich, R. E. Sortor. 1992.

Based on data from Operation DESERT SHIELD combat brigade training, data from the Army Inspector General, active-unit training programs, and RAND observations of RC Annual Training, this report investigates how long it takes RC combat units to mobilize and prepare for deployment. The analysis first defines 12 post-mobilization activities that RC combat units must complete before they are ready to load equipment for overseas shipment. It then estimates the time needed for the activities under three scenarios (optimistic, intermediate, and pessimistic), which vary in assumptions about future RC peacetime training proficiency. The report finds that the optimistic case will require 79 days; the intermediate cast, 104 days; and the pessimistic case, 128 days. These estimates assume that leadership can complete its command and control training in parallel with troop training and that adequate training support from the Active Component will be available. If either assumption does not hold, more time would be required.

MR-125-A *Mobilization and Train-Up Times for Army Reserve Component Support Units.* T. Lippiatt, J. M. Polich, R. E. Sortor, P. K. Dey. 1992.

This report documents research into the time it takes RC support units (such as transportation, engineers, military police, or artillery) to mobilize and prepare for deployment. Using data from 606 units called to duty during Operation DESERT SHIELD, the analysis shows that the time depends on the unit's branch, size (weight of equipment), and mode of transportation (air or sea). Units deploying by air can be ready very quickly (8 to 25 days from call-up to the point when they are ready to load equipment for overseas shipment). Units deploying by sea take longer to prepare (typically 30 days, but up to 10 days more for heavy artillery units), but have more flexibility because they can continue some training while their equipment is in transit to the theater. The report illustrates how the results can make large differences in active/reserve allocation decisions. The methodology, which was applied here to a notional Southwest Asia scenario, will allow defense planners to determine whether particular types of RC units can be available in time to respond to future contingencies.

R-4061-PA&E/FMP *Guidelines for Planning the Cost Analysis of Active/Reserve Force Structure Change.* M. G. Shanley. 1992.

This report presents a set of guidelines for fully defining force-structure changes and for planning the execution of cost analyses involving force-structure change. The guidelines are presented in the form of a "generic" question list designed to extract the critical information missing from a vaguely worded force-structure alternative. The report explains the rationale for each question, suggests procedures for determining answers, and provides examples to illustrate how those answers can affect cost. The full question list is divided into three subject areas: (1) questions designed to extract the exact force-structure change; (2) questions addressing the transition tasks associated with the implementation of a proposed change; and

(3) questions on those changes in resource and activity levels that can drive cost. With even qualitative answers, the analyst should be able to identify the full scope of a force-structure change and the major cost-driving factors that are likely to influence the final results. With that information, the analyst can either plan the detailed work of a longer cost analysis or properly qualify (by highlighting critical assumptions) the results of an immediately required cost estimate.

R-4011-RA *Factors Affecting Reenlistment of Reservists: Spouse and Employer Attitudes and Perceived Unit Environment.* D. W. Grissmer, S. N. Kirby, M. Sze. 1992.

This report examines the reenlistment decisions of early- to mid-career reservists (i.e., those with 4–12 years of service) and the forces affecting those decisions. Using the 1986 Reserve Components Survey of Enlisted Personnel, the authors extended earlier reenlistment estimates in several important directions, including (1) developing a reenlistment model with reservists from all six components to measure the impact of component-specific influences; (2) measuring the influence of perceived spouse attitude on reenlistment and contrasting this with similar measures of perceived employer attitude; and (3) measuring the influence of the training and unit environment on reenlistment. The findings underscore the importance of attitudinal variables in models of reenlistment. Reservists with more-favorable employer attitudes have significantly higher reenlistment rates. Spouse attitude toward reserve participation appears to have an even more significant influence on reenlistment rates than do employer attitudes. The authors find that the net effects of all the variables in the multivariate models are rather small in magnitude compared with those relating to the marital status/dependents/spouse attitude variables. Dissatisfaction with training, equipment, and morale of the unit also appears to have a fairly significant impact on reenlistment.

MR-140-1-OSD *Assessing the Structure and Mix of Future Active and Reserve Forces, Final Report to the Secretary of Defense.* B. Rostker, C. R. Roll, M. Peet, M. K. Brauner, H. Thie, R. A. Brown, G. A. Gotz, S. M. Drezner, B. W. Don, K. Watman, M. G. Shanley, F. L. Frostic, C. O. Halvorson, N. T. O'Meara, J. M. Jarvaise, R. D. Howe, D. A. Shlapak, W. Schwabe, A. R. Palmer, J. H. Bigelow, J. G. Bolten, D. Dizengoff, J. H. Kawata, H. G. Massey, R. L. Petruschell, S. C. Moore, T. Lippiatt, R. E. Sortor, J. M. Polich, D. W. Grissmer, S. N. Kirby, R. J. Buddin. 1992.[4]

This study examines the structure and appropriate mix of active and reserve forces. It analyzes policy issues surrounding the Total Force (that is, active and reserve forces), to include history and effectiveness during the Persian Gulf War. It also evaluates several mixes of active and reserve forces, assuming a range of manning and funding levels. With respect to land forces, the study estimated how long it took different types of units to prepare for combat, concluding that reserve support units were the most critical because they managed the overseas deployments. The readiness of reserve combat units, however, was the most controversial. The study estimated it would take 128 days to prepare a brigade-sized unit for combat. A number of techniques could reduce that time, but rounding out active units at a lower level (e.g., company or battalion) offered the greatest potential for saving time. The study

[4] See also Appendix A.

contains detailed analyses of force structures for Army, Navy, Air Force, and Marine Corps units. It also addresses the ability to sustain different reserve structures and ways to improve the readiness of reserve combat forces.

MR-132-OSD *Assessing the Structure and Mix of Future Active and Reserve Forces, Effectiveness of Total Force Policy During the Persian Gulf Conflict.* M. K. Brauner, H. Thie, R. A. Brown. 1992.

The Persian Gulf Conflict provided the first major test of Total Force Policy. Consequently, it affords unique empirical data about calling up, mobilizing, and deploying the reserve military forces that were the products of the Total Force Policy. This study asks two questions: (1) Did Total Force Policy make the necessary numbers and types of reserve forces available to the National Command Authority? and (2) Were those forces ready to carry out their assigned missions? To answer these questions, the authors used past studies of Total Force Policy and the Reserve Components, after-action reports and lessons-learned commentaries, first-hand experiences of various RAND staff members involved with studies during and after the conflict, and interviews with people who were in strategic positions to observe the working of the Total Force Policy during the Persian Gulf Conflict. In addition to the evaluation, the report discusses implications about the Total Force Policy that might help set policy for future conflicts.

MR-134-1-OSD *Assessing the Structure and Mix of Future Active and Reserve Forces, Cost Estimation Methodology.* A. R. Palmer, J. H. Bigelow, J. G. Bolten, D. Dizengoff, J. H. Kawata, H. G. Massey, R. L. Petruschell, M. G. Shanley. 1992.

This report, part of the congressionally mandated active/reserve assessment study, explains and illustrates the methods, assumptions, and data that RAND used to estimate the costs of alternative force mixes and structures for the Army and the Air Force. The costing task assisted in designing the alternatives, which were sized to meet two possible targets for long-run annual recurring costs: one similar to the existing defense Base Force program and the other consistent with recent proposals to reduce defense spending further. During the study's evaluation phase, the costing task examined the near-term cost of achieving each alternative.

MR-133-OSD *Assessing the Structure and Mix of Future Active and Reserve Forces, Assessment of Policies and Practices for Implementing the Total Force Policy.* L. Lewis, C. R. Roll, J. D. Mayer. 1992.

This report examines the DoD Base Force decision process, assessing how it worked within the framework of the Planning, Programming and Budgeting System (PPBS), DoD's resource allocation and management framework. It evaluates the quality of information and options presented to key DoD players during the implementation, and describes the interactions that took place among these players during the force-structure debate. During the planning phase of the PPBS, debate focused on risk, mobilization, deployments capability, readiness, and cost and cost-effectiveness issues regarding force-structure options. During the programming phase, fiscal constraints were applied to the continued debate. This phase introduced the initial elements of the Base Force. The budgeting phase was driven by costs

and resulted in the implementation of the Base Force. The Base Force process involved the Chairman, OSD, the Secretary of Defense, and the military departments. Each of the military departments responded differently to the possibility of reductions in force structure. The Air Force adapted to the new policy with only minor modifications to its previous program. The Navy accepted the idea of a base force, but argued about what constituted a Base Force. The service most affected by the outcome of the decision, the Army, debated the legitimacy of a Base Force and the numbers involved. The debate among all participants resulted in changes in the final status of the Base Force. The authors assert, in a final assessment of the Base Force Decision process, that, despite the many challenges of DoD's dynamic environment, the decisionmaking framework functioned successfully in that options were raised and debated by all participants.